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DIGITAL TRANSFORMATION OF EDUCATION IN AFRICA:

Bridging the Gaps & Building the Future

BOOK OF ABSTRACTS 2024

FROM THE
EDITORS DESK

The Nigerian Journal of Pharmacy is a publication of the Pharmaceutical Society of Nigeria that publishes original research papers, critical reviews, systematic reviews, and short communications in all areas of Pharmacy Practice. The Nigerian Journal of Pharmacy has ISSN 0331-670X (Print) and eISSN approved number 9876-5432 obtained from the National Library of Nigeria. The eISSN was also accepted for indexation in the prestigious Asian Science Scientific index ASCI-Database (https://www.ascidatabase.com/masterjournallist.php?v=1388) in addition to being indexed by Google scholar and CrossRef®. All the delegates are heartily welcome to the 97th Annual National Conference of the Pharmaceutical Society of Nigeria tagged "IBOM'24". The conference theme: "*Transforming Pharmaceutical Innovation to facilitate equitable healthcare in an emerging economy"* is highly relevant to the current situation in the country. It is noted that sixty-five (65) pharmacists will be presenting their research works as posters during the conference. All the presenters will be listed in the Brochure this year and the Book of abstracts will also be published online. I sincerely want to appreciate all the members of the Poster Sub-Committee and our volunteered reviewers for their meritorious service to the profession.

The corresponding authors of all the abstracts can be contacted freely for further information on their research works.

Best regards,

Prof. Moses A. Akanmu,
B.Pharm, MSc (Ife); PhD (Tokyo), M.Phil. (Stellenbosch) *FNAPharm., FWASP*
Editor-in-Chief

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CONFERENCE ABSTRACT

PSNPIBOM24 004

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Assessment of Differentiated Care Services in HIV/AIDS Management by Community Pharmacists in Rivers State, Nigeria

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Background: Differentiated care in HIV/AIDS management is based on the sufficient evidence that early ART initiation reduces morbidity and mortality is a key strategy to achieving vision 2020 which aims at ending AIDS episode by 2030. Its introduction resulted in upsurge of patient in public health facilities causing long waiting time, dissatisfaction and overcrowding, prompting the devolvement of patients to community pharmacies to promote the community pharmacist-based global strategy to increase access to ART through the differentiated care model to meet the target of HIV/AIDS eradication while maintaining quality of care.

Objective: This study evaluates the roles of community pharmacies as outreach to people living with AIDS through the access to potent antiretroviral.

Methods: This descriptive cross sectional survey employs sets of validated structured questionnaire to measure pharmacist's involvement and practices were administered to registered community pharmacists trained for the HIV/AIDS patient's devolvement to community pharmacies. Collected data were analysed using SPSS version 23. Descriptive statistics of demographics and percentage mean scores for each domain were computed. Frequency statistics, correlation analysis and means testing were used to meet study objectives and identify significance differences at $p < 0.05$.

Results: The study reveals that only 29% of the States community pharmacists' participation in the devolvement program in Rivers State with 77% rate of patient's retention in the devolvement program.

Conclusion: The Community pharmacists-based differentiated care have provided a relief on public health system and effectively provide access of antiretroviral to people living with HIV/AIDS through sustained routine prescription refill history, patient counseling and education to ensure attainment of the required 95% ART adherence.

KEY WORDS: Differentiated care, Community Pharmacists based-care, ART Access, HIV Management.

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Assessment of Patients' Satisfaction with Primary Healthcare Services Provided by Community Pharmacists in Akwa Ibom State: A Cross Sectional Study

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Introduction: The measure of patient satisfaction as a subjective assessment of pharmaceutical services is an important parameter that can be employed to improve the services offered by pharmacists. This study was aimed at assessing satisfaction with primary healthcare services (PHS) offered by community pharmacists (CPs) among patients who assess PHS at community pharmacies in Akwa Ibom State, Nigeria.

Methods: A cross-sectional study among patients assessing PHS at purposively selected communities across the 3 senatorial districts in Akwa Ibom State, Nigeria. Recruited participants who provided a written informed consent to participate in the study were interviewed using a suitably designed survey instrument. The aim of the survey was to assess patients' satisfaction with the quality of PHS provided by CPs in the State. Population sample size was determined with the aid of the Raosoft Online Sample Size Calculator wherein the margin of error, confidence interval and response distribution was set at 5%, 95% and 50% respectively. The obtained data were summarized using descriptive statistics as appropriate.

Results: Five hundred and two (502) participants assessing care from community pharmacies across 9 Local Government Areas in Akwa Ibom State were interviewed. Majority (270; 53.8%) of the participants were female. One-hundred and ninety (37.8%) of the community pharmacies selected for the study were located in semi-urban communities in the State. PHS sought at community pharmacies by our respondents included drug refill/purchase (323; 64.34%)), blood pressure check (269; 53.59%), blood sugar check (220; 43.82%), medication counseling (198; 39.44%), drug information services (189; 37.65%), laboratory result interpretation (171; 34.06%), and family planning services (73; 14.54%). Majority of the respondents (402; 80.01%) were satisfied with the PHS offered by CPs, while about 3.20% of the respondents were extremely dissatisfied with the PHS offered at community pharmacies.

Conclusion: Majority of the respondents were satisfied with PHS provided by CPs. There's a need for periodic evaluation of pharmaceutical services offered by CPs with the aim of improving healthcare delivery in the country.

Key words: Satisfaction, Primary Healthcare Services, Community Pharmacists, Akwa Ibom State.

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Prevalence of sexual dysfunction amongst male diabetic patients receiving treatment in Uyo and its impact on health related quality of life

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Introduction: Diabetes mellitus is a chronic disease associated with various complications, including sexual dysfunction (SD). This study was aimed at determining the prevalence of SD among male diabetic patients and its impact on their health related quality of life (HRQoL).

Method: The study involved 213 male diabetic patients, aged between 30 – 75 years, who attended two healthcare facilities in Uyo from January 2016 to January 2017. Demographic and clinical information were collected using interviewer-administered structured questionnaire while prescription data was collected from patient's case files. Sexual function and HRQoL of the patients were assessed using the International Index of Erectile Function (IIEF) questionnaire and the World Health Organization quality of life instrument short version (WHOQOL-Bref) respectively. Fasting blood glucose, glycosylated haemoglobin, lipid profiles and serum testosterone levels were equally evaluated. Data was analyzed using Stata 15 (Stata Corp, Texas, U.S.A).

Results: The mean age of the patients was 56.7±9.8years with mean duration of diabetes of 8±5.78 years. About 46.9% of the patients were overweight, 54.5% had co-morbid hypertension and impairment in the HRQoL of the patients was significant ($p<0.001$). Overall prevalence of sexual dysfunction was 71.8% (95% CI of 65.3 – 77.8%) with erectile dysfunction accounting for the most frequent domain of sexual dysfunction. Glycaemic control was poor (43.7%). The lipid profile and total testosterone levels of the patients were within acceptable clinical ranges and had no significant association with sexual dysfunction. Significant association with sexual dysfunction was found with body mass index ($p=0.04$), age ($p<0.01$), presence of hypertension ($p<0.001$) and longer duration of diabetes ($p<0.001$) respectively. Independent predictors of sexual dysfunction were age and co-morbid hypertension.

Conclusion: The prevalence of SD among the study population was high and was significantly associated with patients' age, BMI, duration of diabetes, and co-existing hypertension. Predictors of SD were age and co-morbid hypertension. The HRQoL of the patients was significantly impaired, glycaemic control was poor. However, other associated biochemical parameters in majority of the patients were within acceptable clinical ranges. Educational intervention on rational drug therapy and lifestyle modifications are necessary to optimize glycaemic control and prevent complications.

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Assessment of Predisposing Factors, Cardiovascular Risks, and Awareness of Hypertension Risk Factors among Civil Servants in Uyo, Nigeria.

Unyime Eshiet[1], Ekaette Orebiyi[2], Idongesit Umoh[3], Bella Etukudo[2], Eno Anwana[2], Udeme Thompson[2], Okechi Nzedibe[2].

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Introduction: The development of hypertension is influenced by a range of factors including diet, obesity, physical activity, family history, and alcohol/tobacco use. This study was aimed at identifying predisposing risk factors for hypertension as well as assessing awareness of hypertension and its associated risk factors among civil servants in Akwa Ibom State, Nigeria.

Methods: A cross-sectional survey carried out among civil servants working with the Akwa Ibom State Government at the State secretariat in Uyo, Nigeria. A convenient sampling technique was used in recruiting participants for the survey. All civil servants employed by the Akwa Ibom Government and working in the State secretariat who provided informed consent to participate in the study were eligible and thus recruited into the study. Recruited participants were interviewed using a suitably designed, pre-tested data collection instrument. The interview was targeted at identifying predisposing risk factors for hypertension among the participants as well as assessing the respondents' awareness of hypertension and its associated risk factors. Furthermore, the recruited participants were subjected to a cardiovascular risk assessment screening namely: blood pressure check, pulse rate check and body mass index determination. Descriptive statistics was used to summarize data, while Pearson's chi square test (χ^2) was used to assess association between variables with statistical significance set at $p<0.05$.

Results: Two hundred and twenty-nine (229) civil servants participated in this study. One hundred and forty-one (61.6%) of the study participants were female, while 129 (56.3%) of the participants had a positive family history of hypertension. About 41.0% (94) of the participants had blood pressure readings in the hypertensive range with 48 (21.0%) of them being obese. The mean knowledge score of the risk factors for hypertension among the study participants was 5.61 (Standard deviation = $\pm$3.309; Minimum = 0; Maximum = 10), with 36.2% (83) of the participants having a poor level of knowledge (score < 5). There was no statistically significant relationship ($p > 0.05$) between participants' knowledge of hypertension risk factors and their sociodemographic variables, family history of hypertension, and lifestyle.

Conclusion: The prevalence of risk factors for hypertension among the civil servants was high. The participants had an average knowledge of the risk factors for hypertension. There's a need for enhanced public health enlightenment campaigns on hypertension among this population.

Key words: Hypertension, cardiovascular risk, predisposing factors, civil servants.

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Exploring Pharmacists' Knowledge, Perception, and Practice on the Recent Cholera Outbreak in Nigeria

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Background: Cholera outbreak is a significant public health concern in Nigeria, and pharmacists play critical roles in preventing and managing outbreaks. However, there is limited research on their knowledge, perception, and practices about cholera. This study explored pharmacists' knowledge,perception, and practices about cholera during the recent cholera outbreak in Nigeria.

Methods: We conducted a cross-sectional study between August 1 and August 31, 2024. A sample size of 374 pharmacists was calculated using Epi-Info software based on an estimated population of 13,924 licensed pharmacists. The survey tool was distributed across Nigeria's six geopolitical zones, via online and physical platforms. Specific data were collected using a four-structured self-administered questionnaire with focus on pharmacists' knowledge of cholera transmission, prevention, and treatment; their perceptions of the disease; and their involvement in cholera outbreak management. Reliability was evaluated using Cronbach's alpha and Guttman's Lambda. Descriptive and inferential statistics were computed using R (version 4.4.2).

Results: A total hree hundred and ninety-nine (399) pharmacists participated in the study, with a mean age of 40.3 ± 12.6 years from across the country. The majority were males 216(54.2%) and practiced in community 157(39.3%) or hospital pharmacy 140(35.1%) settings. The overall mean knowledge score was 20.9 ± 3.0 out of 30, with 232(58.1%) of pharmacists demonstrating good knowledge of cholera. Most respondents 337(84.5%) had a positive perception of cholera management. Approximately 164(41.1%) reported having managed cholera cases, but only 59(14.8%) had reported cases to the Nigeria Centre for Disease Control (NCDC). Despite good knowledge, barriers such as limited access to formal training and a lack of involvement in disaster preparedness were identified.

Conclusion: Pharmacists in Nigeria exhited good knowledge and a positive perception of cholera disease and are well-positioned to support cholera outbreak responses. Despite their involvement in the management of cholera disease, challenges such as limited access to training and a lack of formal inclusion in disaster preparedness plans must be addressed. Targeted interventions to enhance pharmacists' roles through continuous professional development and structural inclusion in national health emergency plans will be critical in mitigating future outbreaks.

Keywords: Pharmacists. Knowledge. Perception. Practice. Cholera

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Antibiotics Stewardship: Prevalence, Nature, and Factors Associated with Dispensing of Antibiotics without Prescription among Community Pharmacists in Nigeria

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Background AND PURPOSE: Dispensing antibiotics without a prescription is common among community pharmacists in low- and middle-income countries, despite its association with antibiotic resistance. This study described the prevalence and nature of dispensing antibiotics without prescription among community pharmacists in Nigeria and its associated factors.

Method: A cross-sectional study was conducted among community pharmacists in all Nigerian states, with a validated, online, self-administered questionnaire. Reliability was assessed with Cronbach's alpha. Descriptive and inferential statistics were performed with SPSS Version 2023 at a 0.05% level of significance.

Result: A total of 420 community pharmacists participated in the study. The Reliability result was 0.860, implying the data collection tool's perfect internal consistency. Independent pharmacies represented 366(87.1%) of the respondents, and most were in urban areas 299(71.2%). Most respondents 411(97.6%) dispensed antibiotics without prescription, with 353(84.1%) sometimes requesting laboratory investigations before dispensing antibiotics. Cephalosporin, penicillin, and quinolones were the major classes of antibiotics being dispensed. The ability of the antibiotics to cover a wider range of microorganisms 329(78.3%), emergencies 245(58.3%), not getting prescriptions 139(33.1%), pharmacists' confidence in their clinical skills 123(29.3%), the inability of patients to access healthcare services in other places 65(15.5%), and the purchasing power of the patients 201(47.9%) were the key deciding factors for the pharmacists to dispense antibiotics without prescription or substitute class of antibiotics. Factors like patients' demand 38(9.1%), absence of sanctions 38(9.1%), trust in patients' self-diagnosis 31(7.38%), competition from other pharmacies 15(3.6%), fear of losing clients 15(3.6%), financial incentives 14(3.3%), and fear of expiry 17(4.1%) were low in driving decisions to dispense antibiotics without prescriptions.

Conclusions and Implications: Non-prescription dispensing of antibiotics is high among community pharmacists in Nigeria, and is related to various factors. A strategic approach, including a mandatory health insurance scheme, prescription policy, and enforcement of extant regulations regarding antimicrobial stewardship by the Nigerian government is necessary to improve ethical practice and address the irrational dispensing and use of antibiotics in Nigeria.

Keywords: dispensing; antibiotics; prescription; community pharmacists; associated factors

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Knowledge, Perception, and Practices Toward Menopause Among Nigerian Middle-aged and Postmenopausal Women in Nsukka Urban, Enugu State, Nigeria

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Background and Purpose: Menopause is often accompanied by various physiological and psychological changes which can significantly impact the quality of life of women approaching or experiencing this stage of life. The study evaluated the knowledge, perception and practices toward menopause among Nigerian middle-aged and postmenopausal women in Nsukka Urban, Enugu State, Nigeria.

Methods: This cross-sectional study was conducted between February 2024 to April 2024. The study instrument was a validated, 47-item, structured, self-administered questionnaire. Convenience sampling was employed. The Bloom's cut-off points of high (80.0% – 100.0%), medium (60.0% – 79.0%), and low-level (≤ 59.0%) were used for the categorisations of knowledge, perceptions, and practices. Data were analysed with IBM SPSS Version 29.0. using descriptive statistics and Pearson's Chi-square (Significance: $P < 0.05$).

Results: There were 410 completely filled questionnaires. The majority of the respondents were between 45 to 59 years old (n = 276, 67.3%) and had at least two children (n = 356, 86.8%). Few respondents had good knowledge of menopause (n = 53, 12.9%) and positive perception of menopause (n = 61, 14.9%). Less than a tenth of them reported good practices toward menopause (n = 35, 8.5%). Educational level had significant association with knowledge ($\chi^2 = 68.842$, $P < 0.001$), perception ($\chi^2 = 43.022$, $P < 0.001$), and practices ($\chi^2 = 102.410$, $P < 0.001$) toward menopause.

Conclusion and Implications: There is need to improve women's knowledge, perception, and practices toward menopause. Educational programmes, community outreach, media campaigns, healthcare provider training and accessible medical care could be explored.

Keywords: Knowledge; Menopause; Nigeria; Post-menopausal; Practices

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An Evaluation of Drug Therapy Problems Documented By Clinical pharmacists In A Tertiary Hospital in Edo State

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Background and Purpose: Identification and resolution of Drug therapy problems (DTPs) are the bedrock of clinical pharmacy practice. Pharmacists play a crucial role in optimizing medication use and improving patient outcomes through their interventions. However, the extent and impact of these interventions often remain undocumented, hindering both individual pharmacist accountability and the evaluation of pharmacy services. This study sought to evaluate the DTPs documented by clinical pharmacists at the University of Benin Teaching Hospital (UBTH), Benin City, Edo state.

Methods: This was a retrospective cross-sectional study conducted in thirteen pharmacy departments of the University of Benin Teaching Hospital (UBTH), Edo state. All DTPs identified and interventions made between April 2015 and April 2024 were extracted. Data were analyzed with SPSS version 22 descriptively.

Results: A total of 986 drug therapy problems were identified during the study period. Two hundred and nineteen (22.2%) and 267 (31.7%) of these DTPs were identified in paediatric and adult populations respectively. Two hundred and eighteen (22.1%) and 286 (29.0%) of the DTPS documented were for male and female patients respectively. Between 2015 and 2020, 189 (19.1%) DTPs were documented across the various pharmacy departments with the highest (48.17%) being in 2023. Consultant out-patient department-NHIS pharmacy documented 135 (13.7%) of the total DTPs, while Main Theatre pharmacy had the least DTPs [14(1.4%)]. Dosage too high was the most prevalent DTPs [363 (36.8%)], while inappropriate adherence was the least prevalent [15(1.5%)]. Of the 986 DTPs reviewed, the prescribers were contacted 851 times and they accepted 847 of the pharmacists' recommendations giving a 99.5% acceptance rate.

Conclusions and Implications: The documented DTPs of almost a decade in the study period was surprisingly low revealing poor documentation practice among pharmacists compared to the daily and yearly population of patient visiting the hospital. This emphasizes the need for hospital administrators to implement standardized documentation protocol and incorporate digitalization of the process. A high prescriber acceptance of pharmacists' interventions showed that pharmacists have working collaboration with physicians and are viewed to play important role in patient care.

Keywords: Pharmacist intervention, documentation, drug therapy problem, hospital.

Subtheme: Specialization in Pharmacy

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Role of Hospital Pharmacist counselling on Non-pharmacological approaches in managing Chronic Diseases: a systematic review.

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Introduction: Chronic disease is one that persists for a long period. Chronic illnesses include many major diseases and conditions, such as heart disease, cancer, diabetes, arthritis. Disease management is important when dealing with chronic illness; this includes both pharmacological and non-pharmacological approaches. The hospital plays an important role in the management of chronic diseases.

Aim: The aim of this study is to conduct a comprehensive investigation into the roles of hospital pharmacist's counselling on the non-pharmacological management of chronic diseases.

Method: We systematically searched databases like PubMed, Scopus, and Cochrane Library using predefined search terms. Subsequently, relevant data were extracted following the screening of titles, abstracts, and full texts, and findings were synthesised. Well defined inclusion and exclusion criteria was used to ensure adequate collection of data.

Result: Out of the 1,468 articles that were initially obtained from the search, only 10 were included in the final review. Apart from the hospital pharmacist being an expert in pharmacotherapy, this review highlighted more non-pharmacological related roles such as patient education, initiation and monitoring of therapy. This review also identified various non-pharmacological approaches like lifestyle modifications, yoga, stress management and others.

Conclusion: Pharmacist-led interventions contribute significantly to patient education, therapy initiation, and ongoing monitoring, thereby positively impacting patient outcomes and overall well-being.

Keywords: Hospital Pharmacist, Counselling, Non-pharmacological Approaches, Chronic Diseases.

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Community Pharmacy Workforce Willingness, Readiness, and Infrastructural Capacity to Deliver Vaccination Services: A Cross-Sectional Study in Nigeria

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Background and purpose: There is a growing need for community pharmacists' contribution to universal health coverage through vaccination services due to their being one of the most accessible healthcare professionals and low vaccination coverage. In some Nigerian states, community pharmacists were trained in vaccination, but there are concerns about their capacity to enroll as vaccination service providers. This study evaluated the willingness, readiness, and infrastructural capacity of community pharmacy workforce to deliver vaccination services in Nigeria.

Methods: We conducted a descriptive cross-sectional study using self-administered structured questionnaire among community pharmacists in Nigeria through online platforms. Descriptive statistics was performed on the collected data using SPSS statistical software, version 21.

Results: Of the 414 community pharmacists sampled, 395(response rate = 95.4%) were retrieved for the final analysis. Although most community pharmacists were not administering vaccines in their pharmacies (n = 295, 74.9%), most were willing to start administering vaccines (n = 359, 91.3%), participate in routine and supplemental immunization services (n = 373, 95.4%), receive training related to vaccination (n = 374, 95.2%), and encourage patients to get vaccinated in their pharmacies (n = 367, 93.6%). Tetanus vaccine was the most common (n = 158, 40%) among the vaccines administered by the respondents. Infrastructure was inadequate in many critical areas; vaccine-specific refrigerators (n=222, 57.1%), temperature monitoring equipment (n = 263, 67.8%), safety boxes (n = 216, 55.7%), medical waste bins (n = 178, 45.8%), portable vaccine refrigerators in case of power failure (n= 218, 56.1%), anaphylaxis response kit (n = 340, 87.4%), and anaphylaxis management guidance (n = 346, 88.9%). Barriers to the pharmacists' willingness to deliver vaccination services were: inadequate funds to procure appropriate storage equipment (n = 269, 70.0%), inadequate training (n = 265, 69.1%), conflicts with other professionals (n=246, 64.4%), concerns about patient safety (n = 185, 47.7%) and handling vaccines and disposal of sharps (n = 182, 47.4%).

Conclusion and implications: Community pharmacists are willing to embrace the advanced role of vaccine administration. The government and other healthcare stakeholders should address the infrastructural gaps and other barriers highlighted in the study to improve vaccine access and availability.

Keywords: Vaccination; Community Pharmacists; Willingness; Infrastructure; Nigeria

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Knowledge and Health Seeking Behaviour of Students in Tertiary Institutions in Lagos State About Skin Disorders

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Background and purpose: Skin disorders are prevalent health concerns worldwide, significantly impacting well-being. They are the fourth leading cause of non-fatal disease burden and collectively ranged from the 2nd to the 11th cause of years lived-with-a-disability at the country level. Unfortunately, there is a lack of data about skin disorders among university students. This study aims to assess the knowledge and health-seeking behaviour of students about skin disorders.

Methods: A cross-sectional study involving three hundred and ninety-five students from three purposively selected tertiary institutions; (University of Lagos (UNILAG), Lagos State University (LASU), and Yaba College of Technology (YABATECH)) in Lagos state was conducted. Data on socio-demographic characteristics as well as knowledge and health seeking behaviour about skin disorders were collected using a structured questionnaire. Frequencies, percentages and mean were used to describe the variables while the Pearson's Chi-square test was used to establish associations among selected variables. The statistical significance level was set at $p<0.05$.

Results: Most of the respondents were below 25 years old, with YABATECH having the highest percentage (92.1%) and LASU the lowest (87.6%). Only 12% of respondents believe that skin disorders are common, with YABATECH having highest proportion at 19%. Erroneously, about 37% consider triple action creams like Skineal®, etc as essential treatment for most skin disorders while another 31% believe that they should be used as first aid for skin disorders before consultation with clinicians. The proportions in both instances were higher in YABATECH. About 62% of the respondents (55.5%, 65.6% and 66.7% from LASU, UNILAG and YABATECH respectively) reported experiencing skin disorders in the past two years, with 61.4% of them using triple action creams for self -treatment. About 32% indicated that they use these creams routinely for prevention About 55% of the respondents had good knowledge while 52.2% exhibited negative practice towards skin disorders. Gender, school, and level of education were significantly associated with the respondents' level of knowledge.

Conclusion: The study highlighted gaps in knowledge and varying health-seeking behaviours among the students in the selected tertiary institutions about skin disorders. These findings emphasize the need for comprehensive dermatological education to enhance positive health-seeking behaviour.

Keywords: Knowledge; Health-seeking behaviour; Skin disorders; Tertiary institutions; Students

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Assessment of Patient Safety in Health Care Delivery Facilities in Bayelsa State

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Background: Patient safety is a serious global public health issue as it is a fundamental principle of patient care and a critical component of quality management. The most important aspect of patient safety culture is its applicability within healthcare settings. Consequently, this study was designed to assess the overall hospital safety culture in two levels of health care institutions (secondary and tertiary levels) across Bayelsa State.

Objectives: This study focuses on evaluation of patient safety across two levels of health care delivery facilities in Bayelsa state.

Methods: This study was a cross-sectional, descriptive survey conducted using an adopted version of the Hospital Survey on Patient Safety Culture (HSOPSC) developed by the Agency for Healthcare Research and Quality. Data were appropriately analyzed using Statistical Package for Social Sciences (SPSS) version 20.

Results: A total 438 respondents constituted the sample size, majority (71.7%) were registered nurses from secondary hospitals while pharmacists/interns (pharmacists, nurses, medical lab scientists, ophthalmologists) constituted the bulk of respondents from tertiary hospitals and non-medical staff (ward maids, cleaners, gatemen) . Overall patient safety grades when compared between the two levels revealed better positive rating in favor of the higher level (p=0.006).

Conclusion: The patient safety culture in secondary and tertiary hospitals is average with a positive rating in favor of tertiary facilities, with room for improvement. Secondary hospitals show strength in teamwork within units, while tertiary hospitals excel in feedback on errors, teamwork within and across units, management support for patient safety, and supervisor expectations promoting safety.

Keywords: Hospital Survey, Patient Safety Culture, Healthcare Research and delivery, quality.

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Drug Therapy Problems among Recipients of HIV Care in Southern Nigeria: Identification and Management

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Background and purpose: Identifying and managing drug therapy problems (DTPs) enhances treatment outcomes among recipients of HIV care (RoC). This study describes pharmaceutical care interventions in identifying and managing common DTPs among clients on antiretroviral therapy (ART) at three pilot sites in Delta, Ekiti, and Osun states where they were previously non-existent.

Methods: This 10-month preliminary study (October 2023-July 2024) was conducted at three pilot sites in Southern Nigeria: Ika South One Stop Shop (Delta), Federal Teaching Hospital Ido-Ekiti (Ekiti), and State Specialist Hospital Asubiaro (Osun). Selected facilities had RoC accessing care with support from the Excellence Community Education Welfare Scheme (ECEWS) -SPEED project and technical assistance from Howard University. Facility pharmacists who were previously mentored on DTP management reviewed prescriptions and medication profiles of RoC to identify and manage DTPs. They collaborated with prescribers for appropriate interventions which were documented in pharmaceutical care registers. Data analysis was done with SPSS version 26 and presented in frequencies and proportions.

Results: A total of 1,847 clients; 462 (25%) male, 1385 (75%) female; 129 (7%) <15 years; 1718 (93%) >15 years were screened for DTPs within the study period, with 94 (5.1%) DTPs identified. Identified DTPs include non-adherence 36 (38%), ADRs 23 (25%), incorrect regimens 13 (14%), unnecessary therapy 10 (11%), incorrect doses 6 (6%), and incorrect dosing frequency 6 (6%). Individualized interventions provided included regimen or therapy change 51 (54%) and patient counselling and education 43 (46%).

Conclusions and implications: The study highlights the pharmacists' roles in identifying and managing ART-related DTPs and recommends its wider scale-up.

Keywords: *medication adherence, drug therapy problems, medication use review, treatment outcomes, pharmacist interventions.*

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Quality Control Assessment and the Interchangeability of Multi-Sourced Clopidogrel Tablets Marketed in Nigeria

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Background and purpose: Clopidogrel is a potent anti-platelet and antithrombotic medicine. Clopidogrel being an inactive prodrug that requires hepatic bioactivation through several cytochrome P450 enzymes is implicated in several drug-drug and drug-herbs interactions. This study was aimed at assessing the quality control parameters of ten multi-sourced brands of clopidogrel tablets marketed in Nigeria and explored their interchangeability .

Method: Ten different brands of clopidogrel were purchased in registered pharmacies in Port-Harcourt, Owerri, Akure and Lagos. The following quality control parameters were evaluated: colour, shape, weight variation, hardness, thickness, friability, disintegration, content of active ingredient and *in-vitro* dissolution profile according to the Pharmacopoeia's standards (USP, 2009). Model-independent approach was adopted in comparing the dissolution profiles of the samples: the dissimilarity factor $f1$, similarity factor $f2$ and dissolution efficiency (DE).

Results: All the samples complied with the USP standard for thickness, weight uniformity (85 -115%) and disintegration tests (USP, 2015). Samples ACO (4.35 ± 0.34), CCO (5.00 ± 0.00), ICO (4.80 ± 0.92) and JCO (4.98 ± 0.28%) passed the hardness (4 - 8 kg/m^2) test, while samples BCO, DCO, ECO, FCO, GCO and HCO failed the test. Two samples: ECO (1.46%) and GCO (7.88%) failed the friability test (≤1%) while only a sample FCO (72.40 %) failed to meet the USP test for content of active Comparison of $f1$, $f2$ and DE indicated that only sample JCO was found to be similar ($p > 0.05$) to sample ACO (Plavix®).

Conclusion: This study shows that only one brand was similar with the innovator brand or reference standard and therefore can be used interchangeably.

Keyword: Quality control, interchangeability, pharmacopoeia, dissolution, similarity factor.

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Intra-organisational Strategies for Curtailing Drug Shortages in Community Pharmacies in Osun State

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Introduction: There is no quantitative research report specifically addressing intra-organisational methods in low-income countries hence, the specific objective of this study was to determine the intra-organisational strategies employed for managing drug shortages in community pharmacies in Osun State.

Methods: The study was a cross-sectional survey of community pharmacists in Osun State obtained by simple random sampling. Primary data were employed and collected using a set of pre-tested semi-structured questionnaire made up of three sections addressing the methods employed and the extent of their deployment. The items were made of simple a five-point Likert scale with five alternative responses having weighting scores of 1-5. The collected data were analysed using descriptive statistics such as frequencies, percentages, medians (Mdn) and weighted averages (WA).

Results: The results show that the main intra-organisational methods employed for curtailing drug shortages among the community pharmacists were having a policy of avoiding drug shortages in the corporate goals of their pharmacies (Mdn 4, WA 4.11), quick detection and addressing of potential shortages (Mdn 4, WA 4.10) and having dedicated personnel to detect and resolve drug shortages (Mdn 4, WA 4.06), among others. The extent to which the community pharmacists have been employing the methods shows that the most employed methods were once in one or two weeks (Mdn 4; MWA 3) and include the updating of inventory records (Mdn 4; WA 3.9), putting measures in place to detect potential shortages (Mdn 4; WA 3.8), effective communication with suppliers to help resolve potential issues (Mdn 4; WA 4.8), among others.

Conclusion and implications: The study concludes that the intra-organisational methods employed for curtailing drug shortages among the pharmacists include having a policy of avoiding drug shortages in the corporate goals of their pharmacy, quick detection and addressing of potential drug shortages and having dedicated personnel to detect and resolve drug shortages while the most employed methods were once in one or two weeks rather than routinely and a call was made for the intervention of the professional associations including PSN and ACPN as well as PCN and NAFDAC.

Keywords: Intra-organisational Methods, Drug Shortages, Community Pharmacies, Community pharmacists.

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An Analysis of the Nigerian Undergraduate Pharmacy Curriculum and Its Integration of Public Health

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Background and purpose: Current and emerging global public health needs require pharmacists to be trained in basic aspects of public health. The aim of the study was to review the Nigerian undergraduate pharmacy curriculum for their content of public health related topics and modules.

Methods: A qualitative method of content analysis of electronic and print copies of the undergraduate BMAS and CCMAS curriculum was used to describe the Nigerian undergraduate Pharm.D pharmacy curriculum. This involved choosing associated concepts related to public health and quantifying their occurrences. The NVivo® (version 14) software was used to carry out group queries and visualization of results of annotated words and phrases of associated items in the documents under study.

Results: Public health is not a core subject in the undergraduate curricula of many Nigerian schools of pharmacy. The coverage of public health topics was minimal, and are often integrated into other modules. The Nigerian undergraduate pharmacy curricula are still dominated by traditional pharmacy modules.

Conclusions and implications: Public health remains a miniscule part of the undergraduate pharmacy curriculum. Most of the curricula were dominated by traditional pharmacy modules. The skill set of Nigerian undergraduate pharmacy students with respect to dealing with global public health needs should be upgraded in order to enhance pharmacists' dexterity. There is need for stronger integration of public health modules with the traditional pharmacy modules at the level of undergraduate pharmacy curriculum.

Keywords: Public health, global health, pharmacists, pharmacy curriculum, pharmacy education, public health, qualitative method.

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A UK Study of the Content of the Undergraduate Pharmacy Curriculum and the extent of Public Health in Pharmacy Curriculum. Agomo,C.O., Portlock,J.,Ogunleye,J. International Journal of Knowledge, Innovation and Entrepreneurship Volume 8 No. 2, 2020, pp. 5—18.

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Pharmacotherapy with Cognitive Behavioral Therapy in Ambulatory Patients Attending Mental Health Clinic in University of Uyo Teaching Hospital, Nigeria

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Background and purpose: Pharmacotherapy is the most prescribed form of treatment for depression, but usually inadequate due to frequent relapses. The study aimed at evaluating the effect of a combination of Pharmacotherapy and Cognitive Behavioural Therapy on treatment outcomes in the management of depression.

Methods: This study was a longitudinal observational study conducted in the mental health clinic of University of Uyo Teaching Hospital. Ballot method was used to assign 96 participants into the experimental (62) and control (34) groups respectively. The control group received only pharmacotherapy while the experimental received pharmacotherapy complemented with blended cognitive behavioral therapy. The participants were assessed on every visit using Cognitive Structuring and Journaling as tools during the sessions up to week 16 of the research.

Beck Depression Inventory was used for collating data at baseline, 2 and 4-Months post baseline. Data obtained was analysed using the SPSS 26.0 with statistical significance set at $p < 0.05$.

Results: The results of the experimental group at baseline showed that 34 (55%) of the study participants were found in the minimum depression category (0-13) symptom score. At 2 months, 50 (81%) participants were found in the minimum depression category (0-13). At 4 months, 62(100%) study participants were found in the minimum depression category (0-13) symptom score. The comparison of categories. At baseline, the two groups showed no significant variation, for all categories. The comparison of categories at 2 months of study between the two groups showed significant variations, Category 1 ($p=0.01$), Category 2 ($p=0.001$) and Category 4 ($p=0.03$). The comparison of categories at 4 months of study between the two groups showed that participants in Category 2 ,3 and 4 had moved to category 1 in the experimental group whereas 4 participants were found in category 4 at 4 months against 1 participant at 0 month in the control group indicating worsening condition. Conclusions and implications: Most of the participants were single suggesting that these people might be affected by environmental factors such as peer pressure and lack of employment. Also, 55 of them were males suggesting a high prevalence rate of 57.29% of depression in males. The study observed significant improvement in the quality of life of study participants when psychotherapy was combined with pharmacotherapy in the management of depression.

Keywords: Pharmacotherapy, Cognitive Behavioral Therapy, Depression, Symptom score, Quality of life, relapses.

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The Influence of Packaging Design and Color Psychology on Drug Adherence in Students at The College of Medicine Campus, University of Lagos, Idi Araba

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Background and purpose: Medication adherence, or the extent to which patients follow prescribed treatments, is critical for managing chronic conditions and improving health outcomes. However, non-adherence remains a significant issue, particularly among young adults, including students. This study explores how packaging design and color psychology affect medication adherence among students at the College of Medicine, University of Lagos.

Methods: A cross-sectional survey was conducted among students at the College of Medicine Campus, University of Lagos. Data were collected using semi-structured questionnaires and analyzed using SPSS version 25 and presented as descriptive statistics.

Results: A total of 373 respondents participated in the study. The results revealed 55.2% male participants, and the modal age range was 21-25 years. A total of 121 respondents (32.4%) attested to regular medication use or chronic medical conditions. Most respondents (87.4%) thought the design of medication packaging was important in ensuring adherence to their prescriptions. Most respondents (73.5%) agreed that the color of medication packaging influences their perception of the medication's effectiveness and safety. Using 60% as a pass mark, 71% of the respondents adhered to their medication regimens.

The greatest number of respondents (57.4%) were neutral as regards their level of satisfaction with their medications, while 38.6% and 4% were satisfied and dissatisfied with their medications respectively.

Conclusions and implications: Most respondents agree that the packaging design and color of medications packaging are important in ensuring adherence. To enhance adherence, it is recommended that packaging design be optimized to include clearer communication and the use of psychologically effective colors.

Keywords: Packaging design, color, adherence, students

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Assessing the Role of Community Pharmacists in Promoting Antimicrobial Stewardship in Lagos, Nigeria

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Background and purpose: The misuse of antimicrobials has been linked to the subsequent development of bacterial resistance at both community and individual levels. Antimicrobial stewardship (AMS) involves healthcare practitioners ensuring that antimicrobial agents such as antibiotics, antivirals, and antifungals are used responsibly. In low- and middle-income countries like Nigeria, community pharmacists play a pivotal role in healthcare delivery due to their accessibility. However, their involvement in antimicrobial stewardship is not well documented. The objective of this study was to assess the role of community pharmacists in promoting antimicrobial stewardship in Lagos, Nigeria.

Methods: A cross-sectional study was conducted among 213 community pharmacists in Lagos using a structured, self-administered questionnaire. Data were collected between July and August 2024, and analyzed using SPSS version 27. The data was presented using descriptive and inferential statistics.

Results: A total of 213 out of 220 community pharmacists filled the questionnaire correctly, giving a response rate of 96.8%. The majority of the participants (n=199, 93.4%) were familiar with the term antimicrobial stewardship and 98.1% acknowledged their role in AMS. However, only 31.7% had received formal training on AMS, and 67.1% admitted to dispensing antimicrobials without prescriptions. While 98.6% provided patient counseling on antibiotic use, they faced challenges such as patient resistance and time constraints. There was no significant relationship between age, educational level, and years of practice with AMS knowledge ($p= 0.471$, 0.578 and 0.612 respectively) however the position of pharmacists ($p= 0.011$) and formal AMS training ($p< 0.001$) significantly influenced their understanding of AMS.

Conclusions and implications: Community pharmacists in Lagos are familiar with the term antimicrobial stewardship and they acknowledged their roles in promoting AMS, but their practices are hindered by inadequate training and other challenges. There is a need for targeted AMS training programs, policy supports, and improved collaboration between healthcare professionals to enhance community pharmacists' promotion of AMS.

Keywords: Antimicrobial stewardship, community pharmacists, antimicrobial resistance, antibiotic dispensing, Lagos.

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Assessing the Knowledge, Awareness and Perception Of Antimicrobial Stewardship Among Health Practitioners In Healthcare Facilities In Ota Local Government, Ogun State

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Background and purpose: Antimicrobial stewardship (AMS) is crucial for optimizing antimicrobial use, reducing resistance, and improving patient outcomes. However, its effectiveness can vary significantly based on the knowledge, awareness, and perception of healthcare practitioners, particularly in resource-limited settings like Ogun State, Nigeria.This study aimed to assess the knowledge, awareness, and perception of AMS among healthcare practitioners in Ota Local Government, Ogun State, and compare these factors across different professional groups, healthcare facilities, and between rural and urban settings.

Methods: A cross-sectional survey using a semi-structured 46-item questionnaire, was conducted among healthcare practitioners, including physicians, dentists, nurses, pharmacists, and medical laboratory scientists, in some health facilities within the Ota local government. Data were collected on socio-demographic characteristics, professional roles, levels of education, years of practice, and AMS-related knowledge, awareness, and perception. Data was analysed using Epi info 7.2.5 and associations between the variables were analyzed using chi-square tests.

Results: The results showed that pharmacists had the highest awareness (85.7%), while nurses had the lowest (25.1%). Good knowledge of AMS was highest among physicians (68.8%) and lowest among professionals at Ijoko PHC (0%). Perception of AMS was significantly higher among physicians and pharmacists (100% each) compared to other groups. Urban practitioners exhibited better awareness (39.8%) and perception (75.7%) than their rural counterparts (21.7% and 26.1%, respectively). There was a significant association between good awareness and positive perception of AMS ($p = 0.013$), as well as between good knowledge and good perception ($p = 0.000$).

Conclusions and implications: The study revealed fair knowledge, low awareness, and a positive perception of AMS among the practitioners. There is need for targeted educational interventions to improve AMS knowledge and awareness, particularly among healthcare practitioners in rural areas and among professional groups with lower engagement in stewardship activities. Enhancing education, access to resources, and tailored training programs are recommended to foster a more cohesive and effective AMS culture across all healthcare settings in Ota Local Government.

Keywords: Antimicrobial Stewardship (AMS), Heath facilities, Ota Local Government, Knowledge

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Adherence to Pharmacotherapy amongst Hypertensive Patients in Public Health Institutions.

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Background and purpose: Poor adherence to medication is a global challenge facing the Healthcare system and is a major reason for poor blood pressure (BP) control and associated risk complications seen in hypertensive patients. The poor adherence includes failure to initiate pharmacotherapy, to take medications as often prescribed, and to persist on therapy long-term. Several categories of factors including demographic, socioeconomic, concomitant medical-behavioural conditions, therapy-related, healthcare team and system-related factors, and patient factors are associated with nonadherence. The study assessed the level of adherence among hypertensive patients attending hypertension Outpatient clinics in a public health institution using Jos Teaching Hospital (JUTH) as a case study.

Methods: This was a prospective cross-sectional study. Hypertensive patients were consecutively recruited from the Outpatient clinics. Medication adherence was assessed using the 8 item Morisky Medication Adherence Scale. Bivariate and linear regression analyses were conducted using SPSS version 25 and statistical significance was set at $p \leq 0.05$.

Result: A total number of 381 respondents participated in the study. Overall, majority (83.5%) were non-adherent to antihypertensive medication. However, only 16.5% were adherent to their medication. There were more males (57.0%) compared to females. There were more of individua aged 51 – 60 (46.5%) who complied poorly. Based on occupation status, civil servants (46.2%) complied poorly to antihypertensive drugs. Those with HND 1st Degree as their highest degree complied poorly to antihypertensive drugs at 50.1%. Also, those that has been less than 5 years on hypertensive drugs and less than 5 years of being diagnosed with hypertension had the least compliance at 32.3% and 89.5% respectively. Majority of the Some of the factors seen to affect adherence to medication include socio-demographics such as age, sex, monthly income, drug purchasing power and educational status. Other factors such as Insurance cover, relationship with Healthcare Providers (HCPs) and patient knowledge had statistical impact on adherence.

Conclusion: The level of adherence to medication amongst hypertensive patients in JUTH with high adherence was 16.5% and 83.5% scored above >1 on the Morisky's scale. Some of the factors that affected adherence were socio-demographics, forgetfulness, relationship with HCPs and level of patient education.

Keywords; Hypertension, adherence

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The Outcome of the Use of Weekly and Monthly Stock Status Trackers (W/MSST) in Delta, Ekiti and Osun States

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Background and Purpose: Nearly 40% of Global Fund grants go toward procurement of pharmaceuticals and other health products. Increase in the lead time for Last Mile Delivery (LMD), frontloading of clients' ARV refill, undersupply of commodities, increase in consumption, supply of short-dated commodities and poor inventory management are some of the factors that could lead to low stock and out of stock in the states.This study aims to determine the outcomes of the use of the W/MSST at the downstream level to monitor stock levels, prevent expiries and ensure product security and efficiency in facilities in Delta, Ekiti and Osun states.

Methods: This retrospective study involved the development, and deployment of W/MSST by the Howard University team to facilities supported by Excellence Community Education Welfare Schemeon the Sustainable Programs for HIV Epidemic Control and Equitable Service Delivery project across the states in April 2023. These tools monitor the expiry dates, batch number, stock on hand, and months of stock of antiretroviral drugs and opportunistic infections drugs at the end of every week/month. The pharmacy focal persons were mentored on the use of the trackers to initiate an emergency order or facilitate an inter-facility redistribution to maintain the minimum and maximum stock levels of 2-4 months. Data analysis presented in frequencies and proportions was done with Microsoft Excel.

Results: The number of facilities utilizing MSST increased from 15(16%) as of June 2023 to 91(97%) (n=94) as of June 2024. Facilities that were able to maintain their stock on hand between the min-max stock level increased from 11(12%) to 40 (42%) for TLD x 90; 6 (6%) to 24 (26%) for TDF/3TC, 8 (9%) to 24 (26%) for DTG 10mg and 9 (10%) to 41 (44%) for NVP suspension between FY23 Q4 and FY24 Q3. The number of facilities with stock out dropped from 1 (1%) to 0 (0%) for NVP suspension. No facility reported expired commodities within the period.

Conclusion and Implications: The use of W/MSST improves inventory management and product security. They are recommended for use to strengthen logistics systems across all facilities implementing public health programs.

Keywords: *stock-on-hand, months-of-stock, inventory management, product security, minimum/maximum stock levels*

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Sustained Viral Load Suppression Achieved with Patients on Differentiated Services Delivery in Southern Nigeria

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Background and Purpose: Excellence Community Education Welfare Scheme supports the Differentiated Service Delivery (DSD) implementation program in Delta, Ekiti and Osun1States from the commencement of the*Sustainable Programs for HIV Epidemic Control and Equitable Service Delivery* (SPEED) project in August 2022 with technical support from Howard University. Positive treatment outcomes have been associated with DSD. We conducted a retrospective assessment of clients who received care through DSD models between August 2022 to August 2024. The aim of the study was to assess the suppression rates among patients devolved to DSD.

Methods: Eligible clients who presented to facilities for ART refills are offered devolvement into CommunityPharmacy Antiretroviral Refill Program (CPAR), and Decentralization (Hub and Spoke) DSD models. Eligibility criteria assessed include stability on ART (> one year on ART, being virally suppressed, being adherent to treatment). The assessment outcomes are documented in the DSD Assessment and Acceptance form and devolvement properly documented into the DSD register. The community pharmacists and Decentralization focal persons are responsible for subsequent refills, tracking of clients and documentation. ECEWS supports the DSD sites with payment of capitation and tracking stipend. Only patients who have had at least one viral load result after devolvement are included in the analysis. Outcomes analysed included - Sustained viral suppression (at least one VL result <1000 copies/ml), undetectable viral load (VL result <20 copies/ml),viral unsuppression (VL result ≥1000 copies/ml) as of September 2024. Frequencies were used to summarise indices.

Results: At the end of September, a total of 587 clients (Male=185, Female=402) were on both models in the three states (Delta=121; Ekiti=256; Osun = 210, Decentralization= 211, CPART= 376). The median age of the patients was 44 (IQR=38-52). Of this initial figure, 88% (n=518) had at least one viral load result after devolvement. A total of 508 clients (98.1%; Male=97.6%, Female=98.3%) had suppressed results with 86% undetectable viral load results.

Conclusion and implications: Majority of clients on DSD achieved sustained viral load suppression. However, there is a need to strengthen systems to improve viral load undetectable rates among DSD clients.

Keywords: *DSD, sustained viral load, CPART, Decentralization*

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Pattern of Analgesic Prescription and Use in a Nigerian Tertiary Orthopedic Health Facility

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Background and Purpose: Algesia (pain) is an irritating sensation associated with tissue damage or pain-inducing neural transmission. Analgesics therefore are substances used to cause insensitivity to pain without inducing any loss of consciousness.

Objective: The study was carried out to assess the pattern of analgesic prescription and use in a Nigerian tertiary orthopedic hospital.

Methods: The study was carried out at National Orthopedic Hospital Enugu. A Medication Prescription Evaluation Proforma (MPEP) was used to collect relevant information from the patients' medical records. Also, a Medication Prescribers' Evaluation Questionnaire (MPEQ) was also administered to selected doctors. Pearson chi square tests in SPSS 21 were used to determine statistical significance at 95% confidence interval, and p-values of 0.05.

Results: The results showed that all the doctors (100%) involved in the study preferred NSAIDs/ non-opioid analgesics to opioid analgesics. The most frequently used non-opioid analgesics were acetaminophen (33%) and Ibuprofen (25%) while pentazocin (34%) and tramadol (1%) were the most frequently used opioid analgesics. Analgin injection accounted for 18% of all the analgesic administrations. The results also showed that only 33% of the doctors in the study consider drug interactions during their prescription writing. Also, only 20% of them indicated that they do not always adhere strictly to recommended doses, frequencies and routes of administration when prescribing analgesics.

Conclusion and Implications: The study concluded that the pattern of analgesic prescription and use in the health facility met the standards of analgesic drug therapy in terms of choice, dosage, frequency and routes of administration. It was however deficient in terms of pharmaceutical care and therapeutic drug monitoring which could compromise drug therapy outcome and patients' safety.

Keywords: Analgesics, Prescription Pattern, Drug therapy, Pharmaceutical Care, Pharmacists' roles.

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Assessment of Human Papilloma Virus Vaccine Knowledge and Hesitancy in Health Care Personnel at A Tertiary Health Facility in North Central Nigeria- A Descriptive Cross-sectional Study

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Background and purpose: Cervical cancer is a major cause of morbidity and mortality in Nigeria. Human Papilloma Virus (HPV) causes 97% of cervical cancer cases. The Nigerian government introduced HPV Vaccine to its National Immunization Programme at no charge for girls 9 – 14 years in its fight against this malignancy.

This study sought to assess the knowledge of the effectiveness and safety of the HPV vaccine by health personnel. It also sought to determine the presence of vaccine hesitancy, and the willingness to recommend the vaccine.

Methods: A cross-sectional survey was conducted using a pretested structured questionnaire distributed (with ethical approval) among medical doctors, pharmacists, nurses, medical laboratory scientists, pharmacy technicians, and community health workers at the facility between 20th August, 2024– 11th September, 2024 using google forms distributed on WhatsApp and hard copies of the questionnaire. Sample size was calculated using Slovine's formula to be 242. Descriptive and inferential statistics were used in data analysis.

Results: A total of 255 questionnaires were received. The professional distribution of the respondents was; medical doctors 27.06%, pharmacists 11.37%, nurses 36.08%, medical laboratory 13.73%, pharmacy technicians 5.49%, CHEW/JCHEW 6.27%. Majority of the respondents were young, in the 21 – 30 age bracket (47.84%). Most of the respondents (90.98%) knew about the HPV vaccine and believed it was effective and safe. Respondents still expressed concerns that the vaccine might negatively affect fertility. HPV vaccine hesitancy was low in the population (hesitancy score 2.16). Many (92.15%) showed a willingness to recommend the vaccine despite being exposed to anti-vaccination campaigns. Majority of respondents were willing to serve as advocates of the HPV vaccine in their communities and on social media. However, they were unable to point out where clients could receive the vaccine in the study area.

Associations between socio-demographics of age, gender, qualification and experience: For knowledge about HPV vaccine effectiveness, only experience had a p value less than 0.05. For hesitancy, qualification had a p value of 0. 0001.For safety and willingness to recommend the vaccine, all statistics were insignificant.

Conclusion and implication: Vaccine hesitancy was low in the study population. Respondents believed the HPV vaccine to be safe (except for fertility concerns) and effective, with willingness to recommend.

This study augurs well for HPV vaccination in the study region. It shows that health personnel are likely to support the program, which will in turn reduce the incidence and prevalence of cervical cancer. Study limitation- Use of convenience sampling. Recommendation- Improve information on vaccine accessibility and address concerns on fertility.

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Effect of Family Support on Medication Adherence and Glycemic Control on Patients With Type 2 Diabetes in a Tertiary Hospital in South-Western Nigeria

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BACKGROUND and PURPOSE: Adequate glycemic control has been found to delay or reduce both acute and chronic diabetes-related complications. Management of Type 2 DM requires a multifaceted approach in which proper motivation of patients with Type 2 DM is crucial to achieving optimal glycemic control. Achieving optimal glycemic control is dependent on strict adherence to medication and other self-care management. Family support is key for the proper motivation of Type 2 DM patients in achieving set treatment goals.
This study aimed to evaluate the interplay between family support and medication adherence and glycemic control.
METHODS: The study was aimed at determining the influence of family support on medication adherence and glycemic control in Type 2 DM patients attending the endocrine clinic at the Medical Outpatient, in UCH, Ibadan. The study was a cross-sectional study using a validated questionnaire that was interviewer-administered. Socio-demographic characteristics, clinical parameters, adherence score, and perceived family support score were related to the level of glycemic control. Descriptive statistics and Chi-square tests were used to analyze and evaluate the data obtained.
RESULTS: There were 370 participants in the study. The mean age of participants was 59.6 years, and the mean duration of diagnosis with Type 2 DM was 8.2 years. More than 50% of the study participants had good to moderate glycemic control, 53.0% had a high adherence score, and 84.3% of the participants had strong perceived family support. There was a statistically significant relationship between perceived family support and medication adherence and glycemic control, $p = 0.001$ and $p = 0.014$ respectively.
CONCLUSION AND IMPLICATIONS: This study showed that perceived strong family support is requisite motivation required by patients with Type 2 DM to adhere to prescribed medications thereby achieving optimal glycemic control, all cadres of healthcare workers involved in the management of these patients should take advantage of involving family members in the management of Type 2 DM patients.

Keywords: Type 2 DM, Medication adherence, Glycemic control, Perceived family support.

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Internalized Stigma and Mental Health Disorders among People Living with HIV on Antiretroviral Therapy in Akwa Ibom State, Nigeria

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Background and purpose: Assessing internalized stigma and mental health disorders (MHDs) like depression and anxiety among people living with HIV (PLWH) could identify subgroups that might benefit from targeted interventions. This study aimed to evaluate internalized HIV stigma (IHS) and MHDs among PLWH at three public hospitals in Akwa Ibom State.

Methods: This cross-sectional study was conducted among 405 PLWH aged 18 years and older who had been on antiretroviral therapy (ART) for at least a month and gave informed consent to participate. Participants were recruited by convenience sampling and completed a 2-item instrument derived from the Functional Assessment of HIV Infection (FAHI); the Patient Health Questionnaire (PHQ-9); and the Generalized Anxiety Disorder questionnaire (GAD-7). These questionnaires were used to assess IHS, depression symptoms, and anxiety symptoms, respectively. Data were collected between October and November 2023 and analyzed with SPSS v.25.0. Descriptive statistics was used to present data; non-parametric tests (Mann-Whitney U and Kruskal-Wallis H), binary logistic regression, and Spearman's rank-order correlation were performed, with $p<0.05$ indicating statistical significance.

Results: Response rate was 90%. Most of the participants were female (55.6%) and had been on ART for 2-4 years (52.1%). The majority (77.8%) indicated that it was hard to tell others about their HIV infection. Overall, 129 (31.9%) participants reported high IHS. While most participants (69.9%) did not report any depression symptoms, 67 (16.5%) reported severe depression symptoms. Similarly, 72.1% did not report any anxiety symptoms, while 17.3% reported severe anxiety symptoms. Age ($p=0.009$), duration on ART ($p<0.001$), and membership in a support group ($p=0.048$) predicted self-reported depression symptoms, while age ($p=0.003$) and duration on ART ($p<0.001$) were significant predictors of self-reported anxiety symptoms. IHS score had a positive correlation with depression ($r_s = 0.63$, $p<0.001$) and anxiety ($r_s = 0.64$, $p<0.001$).

Conclusions and implications: While IHS was common among participants, MHDs were less frequently reported. Nevertheless, there is a need for regular screening for these disorders among PLWH. Additionally, designing and implementing targeted interventions, particularly in PLWH who are younger, have just commenced ART, or do not belong to a support group, may improve their self-image and mental well-being.

Keywords: Anxiety, Depression, Mental health, Stigma, HIV, Nigeria.

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Knowledge, Awareness And Perception On Antimicrobial Stewardship Amongst Healthcare Professionals In Two Secondary Healthcare Facilities In Lagos State

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Background and Purpose: Antimicrobial resistance (AMR) is a serious threat to global health and human development. Low- to middle-income countries, including Nigeria, suffer the highest burden of AMR. Optimizing the use of antibiotics is critical to the effectiveness of infection treatment, protecting patients from harm caused by unnecessary antibiotic use, and combating AMR. Therefore, the development of antimicrobial stewardship (AMS) programs is necessary. This study assessed the knowledge, awareness and perception of AMS among healthcare professionals (HCPs).

Methods: A cross-sectional, two-phased survey was conducted using an online administered pre-tested questionnaire among 480 HCPs in two secondary healthcare facilities in Lagos, Nigeria. A pilot pre-post study in one of the facilities evaluated the impact of an educational workshop on enhancing AMS awareness and perception. Analysis was done using descriptive statistics as well as multivariate analysis.

Results: Majority of the respondents were females (318, 66.2%), HCPs from both facilities had adequate knowledge of AMS and majority were familiar with the term (332, 69.2%). Profession was the main predictor of level of knowledge and awareness. However, about half (225,46.9%) opined that antimicrobials are overused nationally and agreed that establishing national antimicrobial surveillance may combat AMR. In the pilot study,training significantly improved knowledge and awareness of all HCPs but only improved the perception score among nurses.

Conclusion: HCPs demonstrated good knowledge, moderate awareness and fairly positive perception of AMS which further improved, post intervention. The study revealed educational and training gaps underscoring the need for continuous capacity building on AMS.

Keywords: Antimicrobial Stewardship, Awareness, Perception, Healthcare Professionals, Lagos.

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Use of Contraceptives by Unmarried Women: The Need for Deliberate Health Policy and Pharmacists Action

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Background of the Study: Despite global efforts to increase access to contraceptive services, unintended pregnancies and unsafe contraceptive practices remain a significant issue, particularly among unmarried women in sub-Saharan Africa. This is largely due to cultural and religious beliefs against contraceptives use by unmarried women, and lack of deliberate government policy on contraception for this group. The study aimed to determine how prevalent is the use of contraceptives use among unmarried women. The types of contraceptives used, the sources of the contraceptives, and where information about contraception is obtained were also determined. It is thought that despite the lack of a clear formal contraceptive policy for unmarried women, the use of contraceptives by this demography may be widespread and possibly information about contraception obtained from non-professional sources.

Method: The study used a cross-sectional survey which purposively sampled 100 unmarried women in a community in Jos South Local Government Area of Plateau State using questionnaires and interview. Descriptive statistics and simple percentage were used for data analysis.

Results: The study revealed that 99% of respondents were between 15-35 years old, 85% were students undergoing tertiary education. Also, 98% reported having knowledge of contraceptive methods, 71% knew unmarried ladies who have used contraceptives, and 70% admitted using contraceptives. Condoms were the most commonly used method. Other methods used included emergency pills, everyday pills and injectable contraceptives. Over 80% of respondents acquired the contraceptives from pharmacies, more than any other source. However, on where the respondents got information about contraceptives, there was higher percentage of respondents who got information from friends (54.93%) than those who got information from the pharmacy (30.99%)

Conclusion and Implications: These results revealed a high prevalence of contraceptives use among unmarried women with information obtained from non-professional sources. This may give rise to improper use of contraceptives. It is therefore, necessary for pharmacists to engage in providing contraceptive advise and services to women who come to their pharmacies for contraceptive services. Also, there should be deliberate government policies on contraceptives targeted at unmarried women in order to ensure effective and safe use of contraceptives.

Keywords: **Contraceptives, Unmarried women, Prevalence, Pharmacist's action, Health policy**

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Antimicrobial Stewardship in Community Pharmacies in Uyo, Akwa Ibom State: Practices, Facilitators, and Barriers

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Background and purpose: Antimicrobial resistance continues to pose a public health threat to humanity, particularly in developing countries like Nigeria, where antimicrobials are readily accessible. Community pharmacists are pivotal to the success of efforts to combat this growing threat. This study aimed to evaluate the practices, facilitators and barriers to antimicrobial stewardship (AMS) in community pharmacies (CPs) in Uyo, Akwa Ibom State, Nigeria.

Methods: This was a descriptive cross-sectional study conducted among 112 pharmacists across 95 CPs in Uyo. Pharmacists who had been practicing for at least six months and gave informed consent to participate were included in the study.A 31-item self-administered questionnaire was used for data collection. Data were collected from October to November 2023 and analyzed with SPSS version 25. Descriptive statistics were used to present data.

Result: Respondents were predominantly male (61.6%); 49 (43.8%) had less than 5 years' practice experience.About half (50.9%) indicated that they always educate patients on antimicrobial use and resistance-related issues. Forty-eight (42.9%) indicated they often encourage patients to run a culture/sensitivity test before taking antibiotics.The majority (95.5%) indicated that their choice of antibiotics recommended to patients is based on culture results.The most frequently cited barriers to implementing AMS in CPs were limited access to patient records for evaluating the appropriateness of prescribed antibiotics (93.8%), patient access to antimicrobials without a prescription (89.3%), and physicians' resistance to pharmacists intervening on antibiotic choice (58.0%) or the dose/duration of prescribed antibiotics (50.9%).The most commonly reported facilitators of AMS in CPs were increased availability of pharmacy education programmes on AMS (92.9%), improved access to patients' clinical and laboratory data (88.4%), improved collaboration with physicians in hospitals (85.7%), and public awareness initiatives emphasizing the role of community pharmacists in AMS (85.7%).

Conclusions and implications: The community pharmacists surveyed generally reported good AMS practices. However, initiatives to improve appropriate AMS education programmes for pharmacists and the general public, and also strengthen pharmacist-physician- and CP-hospital collaboration, should be promoted. Future research efforts could expand the study to include other states in order to obtain generalizable findings that could be used to inform national policy.

Keywords: Antimicrobial stewardship; Antibiotics; Antimicrobial resistance; Community pharmacies; Community pharmacists; Nigeria.

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Assessment of the Perception, Readiness and Willingness of Community Pharmacists to Provide Vaccination Services in Edo State

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Background: Vaccines stand out as the most cost-effective intervention in preventing infectious diseases. In recent times, attention has turned to preventing infections and diseases in adulthood. Community pharmacists are possibly underutilized public health professionals especially as they are conveniently located and offer extended working hours. By virtue of their accessibility and reach in local communities, community pharmacists are ideally positioned to promote and provide vaccination services.

Aim: To assess the perception, readiness and willingness of community pharmacists to provide vaccination services in Edo State.

Method: This was a quantitative cross-sectional study that was conducted among 250 licensed and registered community pharmacies in Edo State. Interviewer questionnaire was the data collection tool. Descriptive and inferential ($\chi 2$ test) analyses were done using SPSS software with significance value set at <0.05.

Result: One hundred and fifty-nine (77.6%) community pharmacists had a good perception of pharmacist' involvement in vaccination services. The most common vaccines available in the pharmacies included tetanus [191 (93.2%)], antirabies [123(60%)], hepatitis b [31(15.1%)], and typhoid [31(15.1%)]. Eighty-five (41.5%) pharmacists have been trained in all aspects of vaccination services. Eight (3.9%) pharmacists have in place all requirements in terms of equipment and conditions to providing vaccination services, while 99 (48.3%) meet some requirements. Regarding willingness to engage in vaccination provision, 109 (53.2%) community pharmacists expressed strong desire. Government policy 188(91.7%) and support from pharmacy regulatory body and Associations are enablers, while cost of equipment 165(80.5%) and poor knowledge and skills 160(78%) of community pharmacists are possible hindrances to community pharmacists' participation in vaccination programme. Pharmacists with >5 years of experience ($p=0.00$), owners of pharmacies ($p=0.001$), and those working more than 12 hours daily ($p=0.000$) were more ready to provide vaccine service.**Conclusion:** Most community pharmacists have embraced their expanded role of providing vaccination services. Some are currently providing this service, while others who are yet to get involved are willing to do so. The need for Pharmacy Regulatory organization and Associations to advocate for community pharmacists as vaccinators and training and retraining of pharmacists will facilitate the recognition of community pharmacists in the National Vaccination Programme.

Keywords: Community pharmacists, Vaccination, Willingness, Perception

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Knowledge Attitude and Practice Of Pharmacists In Southern Nigeria Towards The Management And Prevention Of Hepatitis B.

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Background and Purpose: This study sought to measure the attitude and awareness of Pharmacists in Southern Nigeria towards management and prevention of Hepatitis B infection.

Methods: This study was carried out amongst pharmacists practicing in the 17 states in Southern Nigeria. A 39-item, structured questionnaire was distributed online via the WhatsApp groups of the PSN technical groups in the 17 states for 6 weeks in August-September 2024. The 255 responses collected formed the sample size. Statistical analysis was carried out using SPSS v 22 with level of significance set at $P \leq 0.05$

Results: 255 responses were recorded at the end of this period. 100% of the respondents had heard about hepatitis B. 95.7% knew that the virus could be transmitted via blood and blood products, and 73.7% knew that it could be transmitted from mother to child. 63.1 % knew that Hepatitis B is a nosocomial infection. 96.1% knew that a Hep.B vaccine is available. 59.6% had gone for a hepatitis b screening, and 48.6% had received a form of formal training focused on hepatitis. However, only 37.3% had received the HepB vaccine, while 55.3% hadn't received the vaccine.

Conclusion and Implications: The study shows that the respondents have good knowledge, awareness and attitude towards the management and prevention of hepatitis B. However, this did not translate to good practice. Specific training on Hepatitis B should be added to the continuous development program for pharmacists.

Keywords: Hepatitis B, vaccine, pharmacists, infection, Knowledge.

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Prescription Audit Using The World Health Organization-Recommended Core Drug Use Indicators At State Specialist Hospital, Asubiaro, Osogbo, Osun State

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Background: Prescription auditing is an important tool used to assess the quality of medicines prescribed and dispensed in a healthcare system with the aim of improving patients' outcomes. It involves comparing dispensed prescriptions with predefined standards. This ensures that quality prescriptions that meet international standards are generated and patients receive the best of care at all times. The World Health Organization's (WHO) Core Drug Use Indicators are designed to evaluate the rational use of medicines at various levels. These indicators assess the quality of patient care, ensuring that medications are prescribed, dispensed, and used effectively. This study aimed at assessing the prescribing pattern at the State Specialist Hospital, Asubiaro (SSHA), comparing them with the WHO prescribing guidelines, and focusing on WHO AWaRe guidelines for antibiotics. Of the three core indicators, the study focuses on the prescribing indicators.

Method: Retrospective review of prescription sheets dispensed at the Pharmacy department of State Specialist Hospital, Asubiaro, Osogbo was carried out. All prescriptions received at the main pharmacy from June 23 to July 20, 2024 were included.

Results: A total of 701 prescriptions received within the study period were reviewed. These prescriptions contained 2,222 medicines, representing an average of 3.17 medicines per encounter. Multiple antibiotics prescriptions were encountered in 235 (33.5%) of prescriptions given a total of 343 antibiotics prescribed in the 701 encounters. 217 (63.3%) of the antibiotics were from the access category, 99 (28.9%) from the watch category and 27 (7.9%) from the not recommended category. 152 (21.7%) of the 701 prescriptions had injections, and 1,356 (61.0%) of them were prescribed with their generic names.

Conclusion: The average number of medicines per encounter was high, indicating the practice of polypharmacy. There was also excessive prescription of antibiotics. Prescription in brand was also common. However, the average number of injections per encounter was within the stipulated standard.

Keywords: Prescribing indicators, Prescription audit, antibiotics, antimicrobial resistance, Osun State, Hospitals

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Floating Matrix Oral Tablets of Ciprofloxacin Using Irvingia gabonensis Biopolymers for Sustained Release Delivery for Gastrointestinal Infections

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Ciprofloxacin is a fluoroquinolone with a broad antibacterial spectrum against gram negative organisms. *Irvingia gabonensis* seed gum is known to contain arambinogalactan, neutral sugars and uronic acid. It has high molecular weight, good aqueous swellimg capacity to form a viscuous hydrocolloid and random coil conformations providing insight for its use as matrix for controlled drug delivery. This work seeks to use *Irvingia gabonensis gum,* an edible biopolymer, to manufacture ciprofloxacin floating tablets and to carryout *intro* evaluations.

Irvingia gabonensis gum was extracted from the seeds of the plant, evaluated in the solid state and used in the formulation of ciprofloxacin floating tablet by wet granulation method. Excipient-drug compatibility were determined during preformulation studies. Tablets were evaluated for floating, mechanical and release properties. These tablet parameters were compared with those prepared with guar gum, ethylcellulose and hydroxypropyl methyl cellulose (HPMC). The data collected were subjected to one-way Analysis of variance (ANOVA).

Results of preliminary investigations show the gum with a yield of 15.2 % w/w has a pH of 4.5, and viscosity of 200 mPas. Matrix tablets produced with *Irvingia* gum had the fastest floating lag time of 4.5 seconds but the total floating time of 24 hours unlike tablets of guar gum with 3 minutes floating lag time. The floating tablets from Irvingia gum followed zero order release kinetics and had a t_{90} of 6.7 hours whereas the release kinetics from tablets from all other gums were best described by the Higuchi model. At 12th hour only tablets with guar gum had content left having released about 80% drug.

Irvingia gum shows potential for floating matrix tablet attaining rapid floating in less than 5 seconds and sustained released for over 6 hours. With optimization of formulation, this readily available biopolymer will find usefulness in sustained oral drug delivery.

Keywords: ciprofloxacin, floating tablet, *Irvingia gabonensis*, biopolymers, sustained release

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Synthesis and Physicochemical Characterisation of Polymer Conjugates of Efavirenz, Tenofovir and Dolutegravir

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Background and Purpose: Chitosan and alginate are examples of biodegradable polymers which have the advantage of controlled drug delivery, prevent overdose and toxicity. It also increases the solubility of poorly soluble drugs and lowers the antagonist side effects, adverse effects, and toxicity, this advantage helps tackle the challenge of toxicity and poor solubility. The aim of the study is to synthesize and characterize the physicochemical properties of the three anti-retroviral drug-polymer conjugates of chitosan and alginate.

Methods: The synthetic pathways involved the synthesis of three different conjugates labelled as, A, B, and C through a Schiff process reaction, diazotization reaction and an esterification reaction, respectively. After synthesis, the products were purified by recrystallisation and preparative TLC. The calibration curve data and IR analyses were conducted in addition to stability profiling using differential scanning calorimetry (DSC), x-ray diffraction (XRD) and buffer hydrolysis.

Results: The synthetic yield for the drug conjugates was 85%, 75%, and 82% for efavirenz-chitosan (A), Tenofovir-chitosan (B), and dolutegravir-alginate (C), respectively. The drug conjugates obeyed Beer–Lambert's law and showed linear response in the concentration range of 5–40 µg/mL with a correlation coefficient (R^2) of 0.999 for all three drug-polymer conjugates. The IR spectra of conjugate A with the functional group (C=N) appeared at 1997.96 cm^{-1}, B with functional group (N=N) appeared at 2303.5 cm^{-1} and that of C (COO-) appeared at 1736.3 cm^{-1} respectively. The DSC profile of A showed an endothermic peak at 138°C indicating conjugation and retention of the integrity of the polymer while that of B and C showed endothermic peaks at 180°C and 258.12°C, respectively. Buffer hydrolysis studies gave a drug release rate at half-lives of 4.1 hr, 5.1 hr, and 7.5 h, respectively and XRD results indicated the stability of the polymer when conjugated with the drug with broad and sharp peak at $2\theta = 22.5°$, 20° & 24°, and 19.5°& 23.5° for A, B, and C, respectively.

Conclusion and Implication: The three antiretroviral drugs were successfully conjugated to the polymers and the stability profile showed that the polymers were intact after conjugation.

Keywords: Anti-retrovirals, Schiff process, Diazotisation, Esterification, Conjugation, Biopolymer.

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Analysis of Organochlorine Pesticides in Registered Herbal Medicines Sold in Lagos-State, Nigeria.

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Background: Herbal medicines due to their relatively potent therapeutic properties, have gained widespread usage over time. However, they are increasingly being contaminated by organochlorine pesticides (OCPs), posing serious health risks to consumers.

Objective: This study assesses whether contaminant levels (OCPS) in these herbal products exceed Maximum Residue Limits (MRLs) that is established by regulatory body for safety and compliance.

Method: Ten herbal medicine brands were analyzed for the concentrations of OCPs. Five grams of homogenized samples were extracted using a 1:1 hexane-acetone mixture, followed by sonication and concentration to 2 ml. The extract was purified using a silica gel and anhydrous Na_2SO_4 column, eluted with a 1:1 dichloromethane-hexane mixture, and analyzed using GC-MS.

Result: OCPs analysis revealed that heptachlor and aldrin were detected in 50% and 30% of the samples respectively both exceeding the MRL of 0.01mg/kg for heptachlor and 01mg/kg for aldrin. Endrin occurred in 60% of the tested samples surpassing the MRL of 0.05mg/kg. Notably, m,p'-DDD and p,p'-DDT presented high risk with 90% and 40% detection rate respectively again exceeding the MRL of 0.1mg/kg. In contrast, alpha-Lindane, gamma-Lindane, beta-Lindane, and delta-Lindane exhibited low occurrences, with none exceeding their respective limit of 0.1mg/kg. However, with significant portion of the samples found to exceed the acceptable safety thresholds, there is therefore urgent need for stricter regulation and monitoring of pesticide residues in these herbal products to protect the public health.

Conclusion: This study confirms not just the presence of OCPs with exceeded acceptable intake but also the danger of prolonged usage of these herbal medicines, highlighting the importance of safety monitoring.

Keywords: Herbal Medicines, Organochlorine Pesticides, GC-MS, Maximum Residue Limit.

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Analysis of Vitamin C Content in Sweet Potato Tubers (Ipomoea batatas Fam: Convolvulaceae) by HPLC and the DPPH Radical Scavenging Activity

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Background and Purpose: Sweet potato (*Ipomoea batatas*) is a staple food crop that also serves as raw material for the starch industries and as animal feed. It is considered a 3-in-1 functional food product due to its high starch, vitamin and mineral contents, qualities that can be correlated with cereals, fruits and vegetable products. Some phytochemicals in sweet potatoes have been reported to have beneficial effects such as antioxidant, immunomodulatory and anticarcinogenic activities. The study aimed to determine the vitamin C content, phytochemical constituents and antioxidant activity in four varieties of sweet potatoes.

Methods: The vitamin C content was assayed by reversed-phase HPLC separations using an Agilent 1260 Infinity II system equipped with an Agilent Poroshell 120 EC-C18 column (4.6 x 100 mm, 2.7 µm), and a mobile phase, 10 mM hexane sulfonate with 0.1% phosphoric acid in MeOH (74:26), injection volume of 10 µL at a flow rate of 1.8 mL/min at ambient temperature and UV detection at 245 nm. Phytochemical constituents were determined qualitatively using standard procedures and antioxidant activity by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay.

Results: The vitamin C content was 42.87 µg/mL for purple skin and flesh type, 97.99 µg/mL for white skin type, 135.47 µg/mL for orange type, and 126.58 µg/mL for purple skin and white flesh. Phytochemical analysis revealed varying levels of alkaloids, flavonoids, carbohydrates, and cardiac glycosides. The antioxidant activity values (IC_{50} ± SEM) ranged from 4.78 ± 1.80 to 127.70 ± 19.00 µg/ml compared to ascorbic acid with IC_{50} of 2.53 ± 0.25 µg/ml.

Conclusion and Implication: The analysis showed that the four varieties of sweet potatoes contained vitamin C with the orange type having the highest content. The varieties showed diverse phytochemical constituents whereas the antioxidant activity was highest in the purple variety, and was comparable to ascorbic acid standard. This implies that sweet potatoes are a food product that can ensure food security and promote health. This study provides data to support the functional properties of sweet potatoes.

Keywords: Sweet potatoes, Functional food, HPLC analysis, Vitamin C, DPPH antioxidant assay.

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Isolation and Characterization of 5-Hydroxy-rutin-6,7-dimethyl Ether and Cilicocine Flavonoids from Indigofera stenophylla Guil. and Perr. (Fabaceae)

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Background and Purpose: *Indigofera stenophylla*, a plant belonging to the Fabaceae family, is widely used in West African countries, particularly in Nigeria, to manage various health challenges. These include bacterial infections, pain, snakebites, epilepsy, oedema, wounds, inflammation, and gout. The study aimed to identify, isolate and characterize the phytochemical compounds present in the methanol aerial parts extract of *Indigofera stenophylla*.

Methods: The aerial parts of *Indigofera stenophylla* was extracted using 70% v/v methanol to obtain the methanol aerial parts extract of *Indigofera stenophylla* (MAE) which was partitioned into different fractions using n-hexane, dichloromethane, acetone and n-butanol. The butanol fraction was further subjected to column chromatography with a view to isolate phytochemical compounds from the aerial parts of the plant and the isolated compounds were characterized using spectroscopic methods.

Results: The extensive phytochemical investigation of the butanol fraction affords the isolation of 5-hydroxyrutin-6,7-dmethyl ether and cilicocine. The structures of these compounds were elucidated and characterized using various spectroscopic methods, which include thin layer chromatography, ultra violet spectroscopy, infrared spectroscopy, Proton Nuclear Magnetic Resonance (^{1}H-NMR), Carbon 13 Nuclear Magnetic Resonance (^{13}C-NMR), and Two-Dimensional Nuclear Magnetic Resonance (2D-NMR) experiments.

Conclusion and Implication: To the best of our knowledge, this is the first report on the isolation and characterization of the compounds cilicocine and 5-hydroxyrutin-6,7-dimethyl ether from the methanol extract of the aerial parts of the plant species *Indigofera stenophylla*. The identification and structure elucidation of these two compounds contributes to the phytochemical profile of the plant. Exploring the potential biological activities and potential applications of these newly reported natural products may form the basis for its ethnomedicinal uses.

Keywords: Characterization, Cilicocine, *Indigofera stenophylla*, Isolation, 5-hydroxyrutin-6,7- methyl ether.

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Characterization of Zanubrutinib Pharmacokinetics Using In-silico Models

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Background and Purpose: Zanubrutinib is a potent Bruton's Tyrosine Kinase (BTK) inhibitor which was granted accelerated approval in 2019 by the FDA. This study aimed to develop and validate a Physiologically based Pharmacokinetic (PBPK) model to describe the pharmacokinetics of Zanubrutinib across three regimens in non-pregnant adults.

Methods: A previously developed PBPK model built using the SimBiology® software in MATLAB was validated by comparing predicted Zanubrutinib pharmacokinetics against clinically reported values. The validated model was used to run simulations for dosing at 160 mg daily, and 320 mg daily. Zanubrutinib steady-state concentration over a 24 h dosing period was obtained and essential pharmacokinetic parameters (C_{max}, and $AUC_{0\text{-}24h}$) were computed, then the model was used to predict the same parameters for 160 mg twice daily dosing of the drug.

Results: The PBPK model adequately predicted Zanubrutinib plasma exposure in non-pregnant adults. The predicted versus observed Zanubrutinib $AUC_{0\text{-}24\,h}$ and C_{max} ratios for 160 mg OD were 1.51 and 0.53, respectively and for 320 mg OD, the ratios were 1.46 and 0.71, respectively. These values were within the set criteria (two-fold difference) for model validation. The model was used to predict for the plasma exposure of the drug following a 160mg twice daily dosing and the geomean AUC and C_{max} were 3949.15 ng/ml.h and 294.15 ng/ml, with standard deviations of 1.61 and 0.07, respectively.

Conclusion and Implication: The study concluded that the model was robust enough to predict the pharmacokinetics of the drug and can be applied across other clinical scenarios.

Keywords: Zanubrutinib, Pharmacokinetic, PBPK, Modelling, *In silico*

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Determination of Pioglitazone HCl in Tablet Dosage Form by Difference UV and Visible Spectrophotometric Methods

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Background and Purpose: Spectrophotometry is one of the most widely applied physicochemical methods of quantitative analysis and is remarkable for its sensitivity and precision. This study explored the possibilities of improving the selectivity and sensitivity of the analytical method for determination of the Pioglitazone HCl content of tablets using difference UV and visible spectrophotometry.

Methods: Two simple and selective spectrophotometric methods are proposed for the determination of Pioglitazone HCl in pure form and in pharmaceutical formulations. The first method is based on the characteristic modifications of the Pioglitazone UV spectrum induced by pH changes in which different spectra were obtained and the absorbance sum [$(\delta A) = (A_{269} + A_{265})$ in 0.1N HCl and 0.1N NaOH at the wavelength of maximum absorption (λ_{max}) of 269 and 266 nm, respectively], was used for the selective Pioglitazone quantitation. The second method is based on the reduction of permanganate to manganite by Pioglitazone in 0.1N NaOH, followed by the measurement of the resulting bluish-green manganite absorbance in the visible region at 604 nm.

Results: Accuracy [paired difference (95% Confidence Interval): P-value] of 0.15% (-4.04, 4.37): 0.894 did not significantly differ between both the difference UV and visible methods. Sandell's sensitivity ($\mu g/cm^2$) of 0.0263 at δA (or more precisely 0.0608 at 266 nm and 0.0463 at 269 nm) versus 0.0863 at 604 nm.

Conclusion and Implications: The difference UV method is more sensitive, selective, precise and economical compared with the visible method. Both methods were successfully applied to the determination of the active Pioglitazone HCl content of commercially available Pioglitazone tablets, and the strengths/potencies of the study samples are not significantly different.

Keywords: pioglitazone, difference ultraviolet/visible, spectrophotometry, validation, potency.

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Quality Control and Microbial Analysis Of Liquid Herbal Drug Formulations Marketed In Three Main Cities Of South Eastern, Nigeria

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BACKGROUND PURPOSE: The use of herbal drugs is on the increase in Nigeria and worldwide. There have been incidences of adulteration of herbal products and unsubstantiated therapeutic claims by the manufacturers of these products. This study investigated the quality of liquid herbal drugs with antimicrobial activity claims sold in three major markets in South-eastern Nigeria by evaluating their physiochemical properties, microbial content, toxicity, and antimicrobial properties against the stated claims in the labels of the herbal formulations.

METHODS: Forty-five samples of liquid herbal drugs were collected from three major drug markets in the South-East consisting of five different brands (in triplicates). The samples were cultivated using both pour plate, and streak plate methods of cultivation while maintaining aseptic transfer and processes. The culture plates were incubated in an anaerobic jar at 37 ºC for 24 h to check for bacteria growth and at 25 ºC for 72 h for fungal growth. After the due period of incubation, the culture plates were observed for growth of colonies. Each colony was isolated and cultivated into a sterile over dried agar plate and incubated overnight. Gram staining and confirmatory tests were done to determine the isolates. The microbial load of the samples were determined using both the surface viable count and the pour plate count method. The acute toxicity of these samples was also determined using Lorke's method. Antimicrobial analysis was performed using the agar well diffusion method.

RESULTS: 35.6 % of the samples observed contained microbial load within acceptable limits. Bacteria species isolated from the samples include; *Staphylococcus aureus* (33.33 %), *Escherichia coli* (26.66 %), *Bacillus subtilis* (22.22 %), *Bacillus polymyxa* (17.77 %), *Bacillus coagulance* (11.11 %), *Pseudomonas aeruginosa* (11.11 %), *Micrococcus varians* (6.66 %), and *Proteus mirabillis* (2.22 %). Furthermore, the fungi or mould species isolated include; *Microsporum spp* (4.44 %), *Penicillum marneffi* (2.22 %). About 53 % of the samples showed no antimicrobial activity against three common micro-organisms namely *C. albicans*, *E. coli* and *S. aureus* which were indicated on the labels of the herbal formulations tested.

CONCLUSION: Majority of the tested herbal formulations contained microbial load above the acceptable limits. Common isolated organisms belonged to the enterobacteriaceae suggesting faecal contamination. Most of the herbal formulations tested had no antimicrobial activity against the claims in their labels. Many liquid herbal products are not properly regulated and standardized and thus pose a huge health risk to the consumers of such products.

Keywords: **Antimicrobial activity, liquid herbal solutions.**

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Determination of the Microbial Load of some Nigerian Ethnobotanical Plants: An Essential Preformulation Protocol in Phytopharmaceuticals Development.

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Background:. Natural plants may be associated with broad variety of microbial contaminant represented by bacteria, fungi, and viruses which is dependent on several environmental factors hence exact an important impact on the product quality and safety (Kneifel *et al* 2012) Nigeria has a high plant biodiversity that can be investigated for their potential inclusion and utilization as raw materials for the pharmaceutical sector. The microbial profile is a critical attribute of product quality and safety. Pharmacopoeia has microbial limit specifications for herbal products. This study aimed to determine the microbial profile of the stem bark of some ethnobotanical plants such as *Khaya senegalensis* (Meliaceae), *Terminalia ivorensis* (Combretaceae), *and Annona muricata* (Annonaceae) for potential utilization as pharmaceutical ingredients

Methods: The plants stem barks were sourced, authenticated, dried, pulverised and dissolved in 4% v/v Tween 20 and filtered. The plants filtrates were subjected to microbial load determinations using standard established method of USP 2023 Different microbial specific agar media for *E. coli* count, total aerobic microbial count, total coliform count and detection of bile salt-tolerant enteric pathogens, *salmonella and shigella* and total yeast and mold counts were used. Plates for bacterial load were incubated at 37 °C and observed daily for 72 hours, whilst those for fungal counts were incubated at 25 ± 2 °C and observed daily for 7 days. Results were statistically presented, and analyzed using a one-way analysis of variance (ANOVA), with $P \leq 0.05$.

Results: The absence of objectionable organisms such as *salmonella and shigella spps* and *E.coli* in all plants samples were established. The total aerobic microbial count of each of the crude plants was in conformity with the Pharmacopoeia (USP 2023) limits of 10^5 whereas the count for the total yeast and mold counts did not conform to the USP limit specification of 10^3 for TI and KS as they were respectively 70400 cfu/g and 43466. 67 cfu/g

Conclusion: Though, it has been established that the plant materials conformed to most of the Pharmacopoeial acceptable microbial limits, the compliance limit failure for total yeast and mold counts is not acceptable and should be addressed. It is suggested that these plants parts be subjected to thorough cleaning and dry heat treatment protocols to ensure reduction of yeast and mould counts prior to use in prospective product development. It is suggested that strategic measures be undertaken to ensure reduction of yeast and mould counts prior to utilization in prospective product development.

Keywords: Microbial load, *Khaya senegalensis, Terminalia ivorensis, Annona muricata*, Phyto-formulation potentials

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Determination of the Antimicrobial Profiles of some Nigerian Ethnobotanical Plants against Clinical Microbial Isolates from Chronic Wounds.

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Background and Purpose: Antimicrobial resistance presents as an increasing global burden. Natural plants by reason of their bioactive constituents are considered as suitable alternatives to synthetic antimicrobials (Ka Wah *et al* 2023). Some ethnobotanical plants such as *Khaya senegalensis* (Meliaceae), *Terminalia ivorensis* (Combretaceae), *and Annona muricata* (Annonaceae) can be investigated for their antimicrobial potentials. This study aimed to determine the antimicrobial profiles of the stem barks of these plants against clinical microbial isolates from chronic diabetic wounds of patients population in South Western region of Nigeria

Methods: The stem barks of *Khaya senegalensis* (KS), *Terminalia ivorensis* (TI), *and Annona muricata* (AM) were sourced, authenticated, pulverised and respectively subjected to n-hexane soxhlet extraction. Agar well diffusion technique was used to determine the antimicrobial susceptibility-activities and minimum inhibitory concentrations (MIC) of the respective plant extracts against the clinical microbial isolates from the chronic wounds. Each determination was carried out in triplicate and the mean-zones of inhibition were recorded to the nearest whole millimeter. Clinical isolates used were strains of *Staphylococcus aureus* (*Sta*), *Proteus* (*Prs*) *spp*, *Pseudomonas aeroginosa* (*Psa*), *Escherichia coli* (*Esc*) *and Klebsiella.*(*Klb*) *spp*. Gentamicin was used as comparative control. Results were statistically presented and analyzed using a one-way analysis of variance (ANOVA), with $P \leq 0.05$.

Results: Antimicrobial susceptibility test of all plants extracts were comparable with gentamicin and concentration dependent. It was specific to plant extract type, hence TI demonstrated activity against all tested strains of *Sta, Psa, Prs and Klb,* but not *Esc* with inhibition zones ranging from 11.33 mm± 0.94 to 21.66 mm ± 0.47. while KS and AM had activity against some strains of Sta, Psa,Prs, and Esc with respective inhibition zones ranging from 12.66 mm ± 0.943 to 21.67 mm ± 0.4714 and 14 mm± 0.816 to 23.17 mm ± 0.236. Gentamicin had concentration dependent activities against *Psa, Prs, Esc and Klb and* none again*st Sta.* The highest zones of inhibition were seen in *Esc* (31 mm ± 0.47), and *Klb* (28.3 mm ± 0.47), and lowest in *Prs* (17.3 mm±1.25), and *Psa* (16.3 mm ± 0.47). The MIC was plant specific and organism dependent; TI (1.25 to 80), KS (40 to 80) and AM (40) mg/mL

Conclusion and Implications: This study has established the specific antimicrobial profiles for TI, KS, and AM comparative to gentamicin injection against clinical bacterial isolates from chronic wounds.

Keywords: Antimicrobial resistant organisms, chronic wounds, *Khaya senegalensis, Terminalia ivorensis, Annona muricata*

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Evaluation Of the Acute Toxicity Profiles and Antidiarrhoeal Properties of Aqueous and Ethanol Extracts Of *Ipomoea triloba* (L.) And *Glyphaea brevis* (Malvaceae) On Selected Clinical Isolates

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Background and Purpose: Acute Infectious Diarrhoea remains a significant global health issue and is a second leading cause of mortality and morbidity in Nigeria and worldwide in children below five years of age and geriatrics often caused by bacterial and viral infections that lead to dehydration and other complications. The present upsurge in the prevalence of microbial resistance to available antimicrobials stems the need for the search for alternative remedies for the treatment of acute infectious diarrhoea. Hence, this study investigated the antimicrobial efficacy of these plant extracts used folklorically for diarrhoeal episodes.

Methods: Thus, the acute toxicity profiles and antidiarrhoeal properties of aqueous and ethanol extracts of ***Ipomoea triloba*** (L.) (IA, IE) and ***Glyphaea brevis*** (GA, GE) against selected clinical bacterial isolates (***Escherichia coli***, ***Salmonella typhii***, ***Shigella spp***, ***Klebsiella pnuemoniae***, ***Proteus spp*** **and** ***Morganella morganii***.) were evaluated. These extracts were prepared using standardized methods, and their antibacterial activities were assessed with Agar Ditch methods through Minimum Inhibitory Concentration (MIC), Minimum Bactericidal Concentration (MBC), Checkerboard analysis (Combination studies).

Results: Results indicated that with LD_{50} values of 2449 mg/kg (IA, GA), 4472 mg/kg (GE), and 950 mg/kg (IE). Antibacterial results show little activity in singles, better activity at lower concentrations of both extracts in combination but presence of microbial growth at higher concentrations indicating the property of a partial agonist.

Conclusion: The findings suggest that these plants possess potential antidiarrhoeal properties with relative non-toxic profiles thus, supporting their use locally in treating diarrhoea-related ailments. Further investigation into the active compounds responsible for these effects is required.

Keywords: Antidiarrhoeal, alternative treatment, *Ipomoea triloba, Glyphaea brevis,* microbial resistance, acute toxicity

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Antimicrobial Activity of the Seed Extracts of Moringa oleifera, Nigela sativae and Gentamicin on Staphylococcus aureus fromInfected Burns – A Comparative Study

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Background and purpose: In folklore, *Moringa oleifera* seeds and *Nigella sativa* seeds have been associated with 'cure all' properties but without much elaborate empirical scientific backups. This study was necessitated to compare the antimicrobial effect of *Moringa oleifera* seed extract, *Nigella sativa* seed extract and gentamicin on the isolates of *Staphylococcus aureus* from infected burns.

Methods: A total of 20 isolates of *Staphylococcus aureus* from cases of burnt infection were exposed to varied dilutions of *Nigella sativa* seeds and *Moringa oleifera* powder from the stock concentration of each dilution (5 µg/mL, 2. 5 µg/mL and 1.25 µg/mL) as well as 5 µg/mL of gentamicin. The preparation were incubated at 37°C for 24hrs and thereafter checked for the zone of growth inhibition as an index of antimicrobial activity.

Results: *Moringa oleifera* seed and *Nigella sativa* extracts at 5µg/ml, 2.5 µg/ml and 1.25 µg/ml, exhibited remarkable anti-staphylococcal activities at dilution factors 1:2 to 1:4 but lesser antistaphylococcal activity at 1:16 and 1:32 dilutions. *Nigella sativa* seed extract shows more remarkable anti-staphylococcal activity than *Moringa oleifera* seeds extracts. The variation in the anti-staphylococcal properties of the extracts could be concentration determinants or genetic strain variation amongst the organisms exposed. Gentamicin, a broad spectrum antibiotics exerted a 100% anti-staphylococcal activities at four dilution value investigated.

Conclusions and implications: *Nigella sativa* seed and *Moringa oleifera* seed extracts elicited antimicrobial activity in this study which could be considered as an alternative or supportive therapeutic option when purified. Gentamicin - a standard antibiotic with a known efficacy, also exhibited antimicrobial activity on in the treatment of *Staphylococcus aureus* implicated from infected burns examined.

Keywords: Burns, *Moringa oleifera* seeds, *Nigella sativa* seeds, gentamicin.

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Effect of Formulation Methods on the Physicomechanical Properties of *Cissus populnea* Polymers in Paracetamol Tablets

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Background and Purpose: Formulation methods contribute immensely to the physicomechanical properties of tablets. One major excipient that improves tablet strength is the binder. *Cissus populnea* polymers have gained attention as potential excipients in pharmaceutical formulations due to their unique properties. However, their physicochemical characteristics can be influenced by formulation methods. The study assessed the effect of direct compression and wet granulation methods on the physicomechanical properties of *Cissus populnea* polymers in paracetamol tablets.

Methods: *Cissus polunea* (nCPP) was obtained from the fresh inner bark of the stem of the plant while a starch free *Cissus* populnea polymer (sfCPP) was obtained from digesting the starch content of nCPP. Both polymers at concentration of 4% w/v were used for the preparation of three batches each of paracetamol granules and both compressed into tablets using direct compression and wet granulation methods. The micromeritic properties of the granules were analysed while the properties of the tablets were assessed using Crushing Strength (CS), Friability (FR), Disintegration (DT) and Dissolution tests.

Results: The order of performance of both granules and tablets for wet granulation is sfCPP>nCPP>Acacia. The overall performance of tablets produced by direct compression is in the order sfCPP>nCPP>Acacia. sfCPP produced better results for both granules and tablets in wet granulation. The polymer is also outstanding in direct compression formulation.

Conclusion: Formulation methods significantly influence the physic-mechanical properties of *Cissus* populnea polymers in paracetamol tablets. Tablets prepared with sfCPP using both direct compression and wet granulation methods showed better performance than nCPP. However, wet granulation method was better for the preparation of paracetamol tablets using *Cissus populnea* polymers. The physic-mechanical properties exhibited by these polymers suggest their potential as effective binders in pharmaceutical formulations offering a foundation for further exploration and optimization in drug development.

Keywords: Cissus populnea polymers, Formulation methods, Physicomechanical properties.

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Evaluation of Extemporaneous Compounded Frusemide Syrup

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Background and purpose: Extemporaneous compounding is carried out when no licensed product is available that fully meets patient requirements, such as peadiatrics, elderly and those unable to swallow less than the standard dose. The product is not prepared in bulk and dispensed immediately. In order to ensure availability in some situations, they are prepared in bulk and kept for two weeks. Frusemide is used in heart failure, fluid overload, renal failure and short-term treatment to improve pulmonary function with or developing chronic lung disease. With the high demand of extemporaneous Frusemide syrup in the University of Nigeria Teaching Hospital (UNTH), bulk preparations are made and stored for a period of a month. The purpose of this study was to determine the stability of extemporaneous compounded Frusemide syrup prepared in the compounding unit of the Pharmacy Department of UNTH.

Methods: Prepared Frusemide syrups were examined at various time intervals for colour change, odour and presence of gas for 60 days. Similarly, the specific gravity, density of the syrups and pH value were determined at specified times in the course of 60 days. The drug contents were determined using an ultra-violet spectrophotometer at wavelength of maximum absorbance of 271nm taking 580 as the value of A (1%, 1cm) using 0.1M sodium hydroxide as the compensation solution. Microbial assay was carried out using nutrient agar, MacConkey agar, and Sabouraud dextrose agar incubated at 37ºC.Triplicate determinations were carried out for all evaluations.

Results: There were no significant changes in the physical quality, pH, specific gravity and density of the Frusemide syrups. The microbial assay showed that the Total Aerobic Microbial Count (TAMC) and the Total Yeast and Mould Count (TYMC) were within limits (< 102CFU/ml and 100CFU/ml respectively). *Escherichia coli, Salmonella spp., Shigella spp*., and *Pseudomonas aeruginosa* were also absent in the Frusemide syrup.The percentage drug content was also within limit (90 - 110%) throughout the course of the testing.

Conclusions and implications: The extemporaneous compounded Frusemide syrup in the Compounding Unit of the Pharmacy Department of UNTH was found to be stable for a period of 60 days hence it is safe to store prepared Frusemide syrup up to one month.

Keywords: Frusemide syrup, assay, microbiology contaminants

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Quality Assessment of Different Brands of Arthemeter-Lumefantrin Tablets Marketed in South East, Nigeria.

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Background and purpose: Substandard drugs are authorized medical products that fail to meet either their quality standards or specification. The average prevalence of substandard medicines was 19.1 % for anti-malaria and 12.4% for antibiotics according to World Health Organization(2019) . Artemether-lumefantrine(AL) tablet is indicated for malaria treatment. Substandard AL will cause prolonged fever and elicit reoccurring malaria which causes dehydration, organ damage, anxiety on patients and care givers such as parents. Hence, this work focused on the evaluation of the quality of Artemether-lumefantrine tablets marketed in Southeast Nigeria.

Methods: Twenty-seven brands of Artemether-lumefantrine tablets (80/480mg) coded A –Z1 were sourced from various pharmacies in Southeast Nigeria and were subjected to various analysis. Physical examination, Weight uniformity test, Disintegration time determination, Hardness test, Friability test and active pharmaceutical content determination of all the tablets were carried out. Differences between mean data of the various brands and reference standard were subjected to One-Way Analysis of Variance(ANOVA) statistical analysis using SPSS version 17.00. p value <0.05 was considered statistically different.

Results: Results revealed that all the brands passed physical examination, Weight uniformity as well as Disintegration time tests. Weight uniformity test of all the brands showed percentage deviation of less than ±10%. Disintegration times of all the brands were within 5.0 min. 25 of analyzed brands passed the hardness (4-10kgF) and friability (1.0-0.5%) evaluation. Drug content assay showed that all the brands fell within the British Pharmacopeia specification(90-110%)for active content when compared with the innovator product. There were no significant differences with the reference standard.

Conclusion and implications: The study has shown that all the brands of Artemether-lumefantrine in circulation in South east Nigeria met Pharmacopoeia specifications. Therefore, any of the brands can be used interchangeably with innovator product. There is still a need for regular post market surveillance to ensure only good quality AL tablet are distributed in Nigeria.

Key words: Arthemeter-Lumenfantrine, Substandard, Thin layer Chromatography assay, Physico-chemical

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Formulation And Physicotechnical Evaluation Of A Fixed Dose Combination Of Amlodipine And Spironolactone In The Management Of Hypertension

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Introduction: Non-communicable diseases (NCDs) particularly cardiovascular diseases, pose a significant global health burden accounting for 17 million annual deaths worldwide. Despite various therapeutic agents, achieving optimal blood pressure control remains challenging, particularly due to non-compliance with multiple medication regimens. The development of novel Fixed-dose combination (FDC) products has emerged as a promising solution, enhancing patient compliance, reducing costs, and improving therapeutic outcomes in NCD management. The aim of this research is to formulate a fixed dose combination of Amlodipine and Spironolactone which can serve as a ready alternative to the commercially available Amlodipine/hydrochlorothiazide FDC.

Methods: Three batches of amlodipine (ADB) and spironolactone (SPRN) tablets were formulated employing various excipients (binders and diluents) in different concentrations. Pre-compression studies (angle of repose, bulk and tapped density) and post- compression studies (weight variation, hardness, friability, in-vitro disintegration time and dissolution test) were performed to assess the physical and mechanical properties of the granules and compressed tablets.

Results: The granules prepared with 2%, 4%, and 6% binder concentrations exhibited optimal flowability, with angle of repose values <30° and Carr's compressibility index values <10%. All batches exceeded the minimum crushing strength (4kgf), with values ranging from 8.32 – 9.34 kg/cm^2, increasing with binder concentration. Friability tests showed percentage loss of 0.52-0.84%, which is <1. Weight uniformity met the requirement (±7.5% deviation) with average weights ranging from 247.3 – 248.8 mg, except for 1 tablet in Batch B which had the percentage deviation of 7.9. All batches disintegrated within 600 seconds. The ADB and SPRN tablets exhibited a decreased drug release with increase in binder concentration in their first 10 minutes of dissolution studies from 58 - 55% for ADB and 48 - 33% for SPRN. Both drugs achieved 100% drug release in 30 and 20 minutes, respectively.

Conclusion: The FDC formulation of ADB/SPRN into an oral solid dosage form (tablet) was successful. Both the pre and post compression evaluation parameters show promising results and are within the official acceptable limits. This study provides groundwork for further evaluation of the pharmacokinetics and pharmacodynamic studies on the formulated ADB/SPRN FDC.

Keywords: Fixed Dose Combination, Amlodipine, Spironolactone, Hypertension.

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Quality Monitoring of Finished Pharmaceutical Products of Diclofenac Potassium 50 mg Tablets and their *In Vitro* Bioequivalence Studies to the Innovator Brand

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Background and purpose: Substandard and counterfeit medications are significant concerns in the pharmaceutical sector and represent notable dangers to public health. It should be routine to subject the different brands of the same drug to physicochemical tests to determine their pharmaceutical equivalence and the possibility of interchangeability. The study focused on determining the pharmaceutical quality of commercially available brands of diclofenac potassium 50 mg tablets in Lagos, Nigeria in order to determine the quality of their interchangeability with the innovator brand product.

Methods: In this study, eight (8) brands of diclofenac potassium 50 mg tablets were selected from random pharmacies in Lagos, Nigeria. The selected brands were coded DI-1 to DI-8 and were subjected to physicochemical tests of uniformity of weight, hardness, friability, disintegration, assay of drug content, and dissolution studies to determine physicochemical equivalence according to British Pharmacopoeia. The results of the generic samples were compared to the innovator brand, Cataflam®, with reference to the official standard.

Results: All the brands complied with compendial specifications for weight uniformity with percentage deviation of less than ±10 %. All the eight brands passed the friability test (friability values less than 1%). Disintegration of all brands was within 15 minutes. Five (5) of the eight brands passed the hardness test. Only six (6) out of the eight brands passed the assay test with drug content between 90 - 110%. Brands DI-2 had the lowest percentage potency (74%) while Brand DI-4 had the highest percentage potency (137.4%). Dissolution studies showed only six (6) out of the eight (8) brands released more than 80% of the labeled amount in 30 minutes.

Conclusions & implications: Based on the findings from investigation carried out, only brand DI-6 can be used interchangeably with innovator product (DI-1). Brands DI-2 with low percentage potency will cause delay in management of pain while DI-4 with very high drug content could result in toxicity and increased adverse effects thereby impeding the desired health outcomes of the patients

Keywords: Diclofenac potassium, bioequivalence, potency, substandard, physicochemical tests

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Interaction Studies Between a Commercial Herbal Product and Some Commonly Prescribed Antibiotics

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Background and objective: Co-administration of herbal products with orthodox medicines raises huge concerns about herb-drug interactions and patient safety, as a majority of these herbal products are self-prescribed and often used to treat minor and sometimes chronic conditions. The study aimed to investigate any possible herb-drug interactions between Ruzu Herbal Bitters® and some commonly prescribed antibiotics and to determine the constituent of the bitters that may be implicated in the interactions.

Method: Ruzu Herbal Bitters® (RHB) and five antibiotic products were purchased from registered pharmacies and subjected to some physicochemical evaluations. Aqueous extraction of the three constituents of RHB (*Citrullus colocynthis, Curculigo pilosa* and *Uvaria chamae*) was carried out. The disintegration times of the antibiotics in the presence of RHB and the effects of RHB and its constituents on drug release profiles of the antibiotics were investigated. Interaction studies involving absorbance inference study and Fourier transform infrared (FTIR) analysis of admixtures of the antibiotics and RHB or its three constituents were also carried out.

Results: The test antibiotics products met pharmacopeia specifications in their physicochemical properties, except for metronidazole tablets that failed disintegration time test. There was no significant increase in the disintegration times of three antibiotics ($p > 0.05$) while a significant reduction in drug release was observed from amoxicillin-clavulanic acid, amoxicillin and metronidazole products ($p < 0.05$) in the presence of RHB. Absorbance inference study showed there were interactions between the test antibiotic and RHB or its constituents at the various antibiotic concentrations. FTIR spectra showed some level of possible interactions due to the disappearance or reduction of peaks within 1600 - 1000 cm^{-1} (N-H, C=O, C=C, -C=O, -O-C, C-O) in the spectral patterns of the antibiotics with RHB as well as its constituents.

Conclusion: *Citrullus colocynthis* and *Curculigo pilosa*, constituents of RHB were linked in the interactions with most of the antibiotics while *Uvaria chamae* was implicated in interaction with metronidazole. Co-administration of the test antibiotics and RHB may results in interaction that could interfere with the dissolution of test antibiotics.

Keywords: antibiotics, interactions, herbal bitters, co-administration

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Formulation and Characterization of Ophthalmic In Situ Gels for the Management of Glaucoma

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Background and purpose: Glaucoma is a chronic eye disease and management is usually by eye drop instillation twice daily. Ocular barriers and short resident time of the eye drop on the cornea lead to uneven dosing, low bioavailability, systemic drainage and poor adherence to therapy. This study aims to formulate in situ gels (ISGs) using stimuli-sensitive polymers in order to increase the resident time of the formulation on the cornea which will lead to once-daily instillation, compliance to therapy and reduced systemic drainage.

Methods: Timolol maleate (TM) in situ gels, F1 to F12, were formulated using different concentrations and combinations of ion-sensitive polymers - gellan gum (GG), sodium alginate (SA) and thermosensitive polymers - hydroxypropylmethylcellulose of varying viscosities - low, medium and high viscosity (HPMC- LV, HPMC -MV, HPMC-HV). The formulations were evaluated for physicochemical characteristics, gelling capacity, gelling temperature, drug content uniformity, rheological behaviour and release kinetics.

Results: All formulated ISGs were clear, colorless and free of particles. Formulations F2 (GG 0.2%, SA 1%) F9 (GG 0.2%, HPMC-MV 0.6%) F11 (GG 0.2%, HPMC-HV 0.2%) and F12 (GG 0.2%, HPMC-HV 0.3%) had the highest gelling capacities while Formulation F1 (GG 0.2%, SA 0.5%) had the lowest gelling capacity. The pH of all formulations was between 5.27 and 6.81 which is within the acceptable range for comfort. The viscosity of the formulations at a shear rate of 100/s showed F1 had the lowest viscosity of 32 cp and F9 had the highest viscosity of 202 cp at room temperature. Drug release studies showed sustained release of approximately 50% of the ISGs in 3 h compared to 30 mins for conventional timolol maleate solution.

Conclusions and implications: *In situ* gels formulated using ion-sensitive gellan gum and medium to high viscosity temperature-sensitive HPMC can potentially increase the resident time of TM ocular medications in the eye and improve patient adherence to therapy.

Keywords: Glaucoma; timolol maleate; in situ gels; stimuli-sensitive polymers; ocular delivery

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Evaluation of the Memory Enhancing Activity of Dichloromethane Fraction of the Methanol Extract of *Pycnanthus angolensis* Stem Bark on Experimental Models (Behavioural) of Memory Impairment.

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Background: *Pycnanthus angolensis* (Welw) Warb., Myristicaceae, is used extensively in ethnomedicine to treat various ailments including hyperglycaemia, sterility in women, infections, pains, worm infestations, bleeding, inflammation and cognitive deficits.

However, the effectiveness of the plant in the management of cognitive deficit has not been fully evaluated. This presentation therefore presents the effect of the stem bark of the plant for memory enhancing activity in mice.

Methods: The plant material was grinded into powder and extracted by maceration with 80% methanol at room temperature for 48 h. This was subsequently fractionated using N-hexane, Dichloromethane (DCM), and Ethyl acetate. The Dichloromethane (DCM) fraction-the most potent fraction at the dose levels of 5, 50, and 100 mg/kg (p.o.) was evaluated for memory enhancing activity using the Y maze, Morris Water Maze (MWM) and the Elevated plus maze (EPM), on the D-galactose (0.5 ml of 5% ^{W}/v i.p.) plus scopolamine (3 mg/kg, i.p.) and ketamine (20 mg/kg ip) induced amnesia model. The antioxidant markers and acetylcholinesterase inhibiting effect of DCM were also evaluated using the standard methods.

Result: The results obtained from the behavioural studies indicate that the DCM fraction significantly ($p<0.05$) increased the alternation behaviour of the mice in the Y maze, decreased the escape latency in the MWM paradigm and decreased the transfer latency (TL) in the EPM. Biochemically, DCM increased Glutathione (GSH), and superoxide dismutase (SOD), but decreased Malondialdehyde (MDA) and acetylcholinesterase (AChE) activity in the brain.

Conclusion: The study therefore suggested that the DCM may possess significant memory enhancing activity, which may be due to the reverser of the activity of scopolamine, thereby, enhancing cholinergic transmission. The attenuation of the effect of ketamine by the DCM may possibly result from an increase in NMDA receptor activity.

Key words: Percentage alternation, escape latency, discrimination index.

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Hepatoprotective and Renal Effects of the Administration of Tannic Acid in Streptozotocin Induced Diabetic Rats

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Background and Purpose: Tannic acid (TA) is a polyphenol that is found in a variety of plants and fruits, and is well known to have several pharmacological activities. This study was designed to evaluate the hepatoprotective and renal effects of tannic acid administration in streptozotocin- induced diabetic rats.

Methods: Fifty four male albino rats of mean weight 130 g were used for this study. The animals were grouped into nine of six rats each. Group 1 (normal control), group 2 (diabetic control), and group 5 (drug control). Test groups (3), (4) and (6) were orally given 100, 200 and 400 mg/kg body weight of tannic acid. Groups (7), (8) and (9) were the groups that received the tannic only (100, 200, and 400 mg/kg body weight).

Results: There was significant ($p< 0.05$) decrease in the fasting blood glucose concentration of the rats in the test groups, positive control group when compared to the negative control (untreated group) from week one to week three indicating that tannic acid and the standard drug (glibenclamide) were able to lower the blood glucose level. For the liver parameters (alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, total bilirubin and conjugated bilirubin) there was significant ($p< 0.05$) decrease in the test groups and the groups that received the tannic acid only when compared to the negative control (untreated group) and the normal control respectively. For the renal function parameters (urea and creatinine), there was no significant ($p> 0.05$) decrease in the test groups when compared to the negative control (untreated group).

Conclusion and implications: The results of this study indicate that tannic acid possesses hepatoprotective effects and antidiabetic properties capable of lowering blood glucose level. The compound should therefore be employed in the formulation of more effective hypoglycemic and hepatoprotective drugs that will improve human health.

Keywords: Tannic acid, hepatoprotective, renal effects, streptozotocin, diabetic, alanine aminotransferase, creatinine.

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Evaluation of the Hematological Effects of Crude Extract and Fractions of *Napoleonae imperialis* in Streptozotocin - Induced Diabetic Rats

Evaluation of the Hematological Effects of Crude Extract and Fractions of Napoleonae imperialis in Streptozotocin - Induced Diabetic Rats

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Background and Purpose: *Napoleonae imperialis* is a medicinal plant that is widely used all over the world. This study was designed to evaluate the hematological effects of crude extract and fractions of *Napoleonae imperialis* in streptozotocin- induced diabetic rats.

Methods: This study was divided into two phases. In phase one, forty - two male albino rats of mean weight 140 g were used for the study. The animals were grouped into seven groups of six rats each, as follows: Group 1 (normal control), group 2 (diabetic group), group 3 (drug control); groups 4, 5 and 6 were the test groups administered 250, 500 and 1000 mg/kg body weight of the crude extract, group 7 received 500 mg/kg body weight of the extract only. There was significant ($p < 0.05$) decrease in blood glucose concentration in groups 3 - 7 when compared with group 2. There was significant ($p < 0.05$) increase in Hb, MCHC, RBC and WBC concentrations in groups 3 - 7 when compared with group 2. In phase two, a total of 54 animals of mean weight 140 g were placed into nine groups of six rats each as follows: Group 1 (normal control), group 2 (diabetic control), group 3 (drug control), while groups 4 - 9 received fractions 1 - 6 respectively for 28 days.

Results: The results showed that fractions 2, 5 and 6 significantly reduced blood glucose concentration, when compared with group 2. There was significant ($p < 0.05$) increase in Hb, MCHC, RBC and WBC in fractions 2, 5 and 6 when compared with group 2.

Conclusion and implications: These findings suggest that crude extract and fractions of *N. imperialis* possess hypoglycemic properties and increased Hb, MCHC, RBC and WBC concentrations. Investigation is needed to exploit the plant's other relevant therapeutic effects to substantiate its ethnomedicinal usage.

Keywords: *Napoleonae imperialis,* streptozotocin, hematological, diabetic, hemoglobin, red blood cell, white blood cell.

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CONFERENCE ABSTRACT

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AS MEN OF HONOUR WE JOIN HANDS
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Advancing Multi-Target Drug Discovery: Predictive QSAR Models Using Machine Learning for Diabetes Therapy

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Background and Purpose: The incretin system, including Glucagon-like peptide-1 (GLP-1), Glucagon Receptor (GCGR), and Gastric Inhibitory Peptide (GIP), plays a central role in glucose homeostasis, positioning these proteins as critical targets in diabetes drug discovery. However, identifying ligands with high potency across all three receptors remains a challenge due to limited experimental data. The objective of this study was to develop machine learning-based QSAR models that can predict ligand efficacy (EC_{50} values) across the GLP-1, GCGR, and GIP targets, using computational methods to enable cross-target prediction where experimental data is unavailable.

Methods: Bioassay data for ligands targeting GLP-1, GCGR, and GIP were extracted from the ChEMBL database and curated into a unified dataset. Data preprocessing included cleaning, filtering of data, normalization, and feature selection to highlight molecular descriptors relevant to biological activity.

Using a training/test split of this data into a ratio of 80/20, multi-target machine learning (ML) models were constructed using random forest algorithm to predict EC50 values for each receptor, and Y-scrambling was applied to assess chance correlation.

Results: The models achieved R^2 values of 0.82, 0.76, and 0.90 for GLP-1, GCGR, and GIP, respectively. Cross-validation (Q^2CV) values were 0.77 ± 0.06, 0.71 ± 0.05, and 0.73 ± 0.05, and external validation (Q^2Ext) values were 0.78 ± 0.05, 0.81 ± 0.06, and 0.83 ± 0.05. The application of cross-learning significantly improved prediction accuracy for untested targets, reinforcing the utility of this approach in drug discovery. All constructed models exhibited $R^2$and Q^2CV values that exceeded 0.76 and 0.64 respectively with low mean absolute error values. This indicates high model quality and predictive capability for the targets.

Conclusion and Implication: This study demonstrates that ML models can effectively predict ligand activity across multiple diabetes targets. It offers an efficient framework for ligand screening, particularly when experimental data is sparse or incomplete.

Keywords: Incretin system, EC_{50} values, Machine Learning, Molecular descriptors, QSAR models.

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Co-administration of Artemether-Lumefantrine and Promethazine has no Adverse Effects on Haematological Indices and Organ Weight Ratios in Mice Infected with *Plasmodium Berghei Berghei*

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Introduction: Today, nearly half of the world's population is at risk of malaria, it is a major public health problem in Nigeria. The emergence of drug-resistant strains to artemisinin-based combination necessitates the need for sourcing for alternatives and combinations. However, drug co-administration also presents challenges like drug interactions and the need for careful monitoring. Promethazine demonstrated activity against *Plasmodium falciparum* through haemoglobin digestion. This study evaluates the effects of co-administration of promethazine and artemether-lumenfantrine on haematological parameters in mice infected with *Plasmodium berghei berghei.*

Methods: The mice were grouped into six groups of 6 mice each. Groups 2 – 6 were inoculated with *Plasmodium berghei berghei* groups. Drug administration was carried out orally for 5 days, 72 hours after parasite inoculation and parasitaemia seen. The mice were sacrificed on the 8th day. Blood samples were collected for haematological evaluation.

Results: Promethazine gave a significant reduction in haemoglobin (Hb), Pack cell volume (PCV), red blood cell (RBC), and increase in neutrophils compared to artemether-lumenfantrine alone, but no effects compared to the infected control. The co-administration of promethazine (25 mg/kg) with Artemether-Lumenfantrine gave a marginal reduction, but not a significant difference in Hb, PCV and RBC. The 50 mg/kg dose of promethazine co-administered with artemether-lumenfantrine gave lower values of PVC, Hb, and RBC than the 25 mg/kg promethazine dose plus artemether-lumenfantrine.

Conclusion: Co-administration of Promethazine and Artemether-lumenfantrine possesses no significant haematologic effect over Artemether-Lumenfantrine alone.

Key words: Arthemether-lumenfantrine, promethazine, co-administration, haematological.

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Exploring the Hepatoprotective Potential and Chemical Profile of Methanol Extract from the Aerial Parts of *Indigofera stenophylla* Guil. and Perr. (Fabaceae)

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Background and Purpose: *Indigofera stenophylla* Guil. and Perr. (Fabaceae) is a medicinal plant used in traditional herbal medicine for the treatment of bacterial infections, pain, snakebites, epilepsy, diuretic effects, wound healing, swelling, and gout. This study aimed to isolate, characterize some phytoconstituents and establish the hepatoprotective activity of the methanol aerial parts extract of *Indigofera stenophylla*.(MAEIS)

Methods: The plant material was extracted with 70% methanol using a maceration method, and the extract was partitioned into hexane and chloroform fractions. The hexane fraction was subjected to column chromatography leading to isolation of compound coded AR1. The isolated compound AR1 was characterized using physical, chemical test, combinations of spectroscopic methods and comparison with reported literature data as lupeol. A single dose of 7,12 dimethylbenzanthracene (DMBA) was administered orally at 30 mg/kg body weight, followed by 28 days of treatment with graded doses of MAEIS and silymarin. Blood samples were collected, and livers were harvested.

Results: The isolated compound was elucidated to be lupeol. The MAEIS treated groups and silymarin as positive control were compared to the normal control group. The MAEIS group at dose of 600 mg/kg and silymarin 50 mg/kg body weight respectively lowered the levels of AST and ALT significantly ($p<0.05$) indicating a reduction in liver damage. The MAEIS increases the total protein levels, suggestive of improved liver function, and normal histopathological profile of the liver tissue.

Conclusion and implication: The presence of this bioactive phytosterols including lupeol in MAEIS provides a scientific basis for its ethnomedicinal uses and demonstrated significant hepatoprotective activity.

Keywords: *Indigofera stenophylla*, Lupeol, 7,12 dimethylbenzanthracene, Liver Enzymes.

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Assessment of Antimicrobial Resistance Pattern of *Escherishia Coli* in Patients at a General Hospital in Abuja, Nigeria

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Background and Purpose: *Escherishia coli (E.coli)*is a gram negative bacterium implicated in various infections and has demonstrated a widespread resistance to many drugs[1]. The aim of this study was thus to determine the prevalence and resistance pattern of *E.coli* to antibiotics in a secondary healthcare facility, Abuja Nigeria.

Methods: Ethical clearance was obtained from the relevant authorities. The study adopted a retrospective design in which results from urine-based laboratory test results tested against Ceftriaxone (CTR), Gentamicin (GEN), Co-Trimoxazole(COT), Levofloxacin(LE),Netilin(NET), Tetracycline(TE), Amoxicillin(AMC) and Ofloxacin(OF) and documented in patient's records were obtained. Descriptive data analysis was done using percentage, frequency, mean and standard deviation with the aid of SPSS version 25.

Results: The results revealed majority of the occurrences were in patients between ages 25-31(26%) and in Females (87%). *E.coli* revealed sensitivity to: LE (97.4%), OF(94.8%), NET(94.8%), GEN(90.9%), TE(45.5%), COT (37.7%) and AMC(9.1%). The resistance pattern was AMC (90.9%), COT (62.3%), TE(54.6%), CTR(20.8%), GEN(9.1%), NET(5.2%), OF(5.2%).

Conclusions and Implications: *E.coli* showed high resistance to Amoxicillin and Co-Trimoxazole indicating chances of multidrug resistance and showed high sensitivity to Levofloxacin and Ofloxacin. A reflection of the findings in prescription pattern is advised and further approaches to reduce antibiotics abuse are strongly encouraged.

Keywords: *E.coli*, Antibiotics, Resistance pattern, Hospital, Abuja

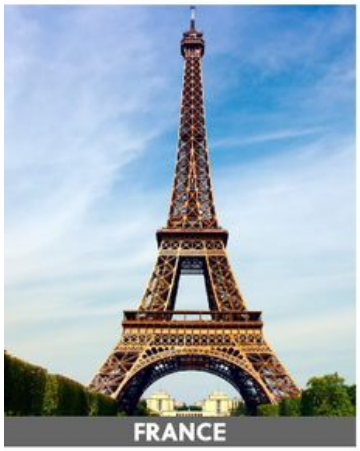
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Aika, I. N., & Enato, E. (2022). Antibiogram of clinical isolates from primary and secondary healthcare facilities: A step towards antimicrobial stewardship. *PLOS Global Public Health*, 2(12), e0000644. https://doi.org/10.1371/journal.pgph.0000644


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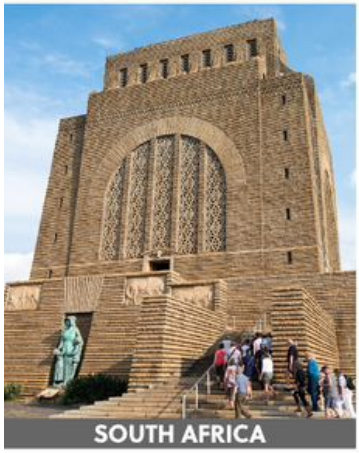
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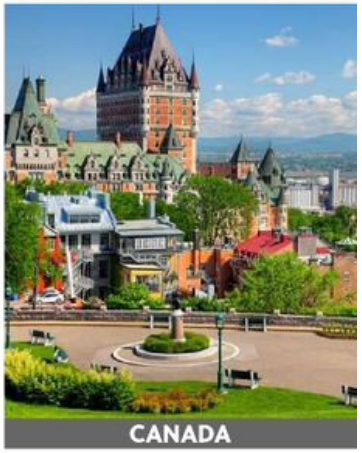
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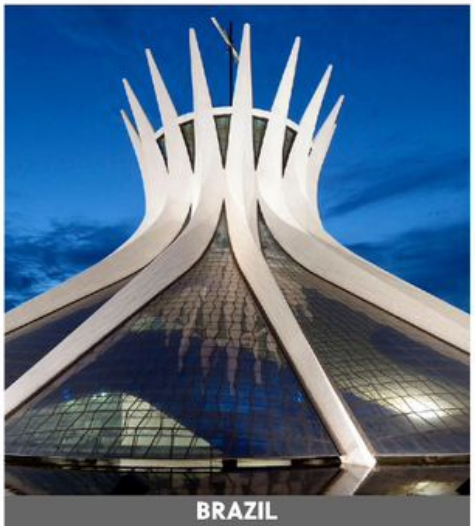

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